RAILROAD GAZETTE

FRIDAY, JUNE 27.

Contributions.

The Civil Engineers' Convention.

NEW YORK, June 23, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I think your editorial of last week hit upon the true method of conducting conventions of the American Society of Civil Engineers, that is, to divide the papers into selected subjects and assign sufficient time for their reading. One day ought to be enough for general junketing, and any time requisite for local studies can be taken on the day or half-day which is to be occupied by the papers that are not of interest to the student.

The plan of dividing the convention into sections is objectionable on account of the liability of interference, as the number of members that have interest in only one subject is probably largely exceeded by those interested in all the papers that come before the convention.

It will probably appear to all that the "social element" reached at Buffalo a greater development than is advisable, and with a membership so widely dispersed it is not an economy of either time, space or material to come so far to gain so little professional good.

If all papers presented at Buffalo had been printed and distributed among those members likely to take interest in the various subjects, say a month before the convention, and time allowed so that the person sending a paper had not felt he was defrauding others of scant opportunity, no one can doubt that, taking advantage of the views and experience of what was probably the largest gathering of engineers ever held on this continent, very valuable discussions would have resulted.

There seems no valid reason for not having convention papers in in time to be distributed to the members interested before the meeting, and at the same time publishing a programme for their reading, so that members may know what is before them.

Referring to the appliances for pleasure, it is doubtful if they could have been much better managed: there was not only a plentiful (possibly too plentiful) expenditure of money, but a careful regard for the comfort and convenience of the members and guests on the part of the people of Buffalo, which was very gratifying. The reception Friday night was a very enjoyable affair to the members of the Society at least, and though you have been pleased to give what may be considered an undue prominence to the commencement of "cocktails" and ending of "punch," they were only two items in a long list of solids. N.

Train Nomenclature.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following special rule appears on employes' time-tables of the West Shore road, just issued:—

"Trains answering Green Signals will be known as SECTIONS: Regular trains carrying signals as FIRST SECTION, trains answering the signals as SECOND SECTION, and so on indefinitely."

In common with the majority of New York roads, the West Shore trains have heretofore been designated as "regulars," (trains appearing on time-table), "extras," (trains following signals carried by regulars), and "wild-cats" (irregular trains.) This nomenclature has been in use many years in this state, and has the advantage of being plain, terse, and readily understood. The most natural definition of a train that runs regularly is "regular," and the prefix being understood, "regular 46" becomes "46," and is known as the train on the time-tables, whether carrying signals or not. "46" is shorter than "first section of 46."

Webster defines *extra* as "something in addition to that which may be expected." The regular being always expected, signals properly indicate a train answering Webster's definition. To speak of an irregular train as "an irregular" would be somewhat awkward. The origin of the use of the word "wild-cat" to cover this class is rather dim; but as the wild-cat is certainly an irregular animal, and usually happens around unexpectedly, the term is not wholly inappropriate.

Some Western roads have shortened the word, and have "*wild* trains," but to the uninitiated the order to "run wild" scarce seems consistent with the care our roads use in running trains. The order "Wild-cat to ——" is not open to this objection.

Just what the West Shore will gain by calling their extras sections is not readily apparent. A train broken in two or more parts may properly be said to be in sections, but why should a separate and distinct train in itself be called a section of another train? It has its own conductor and engineer, each having his own responsibilities, and as a rule of several of our New York roads says, "Extras have the same general rights as the regular trains, but a special order to the regular will confer no rights upon the extra, and unless it receives special orders it must keep within the table rights of the regular train." For instance, on a single-track line, a regular train not having the right of road might receive an order to "run regardless" of a certain train to a certain station; which order would not empower an extra to follow, unless it received the same order.

Now a train, under what we may properly call the New York system, would be known, say, as "3d extra 46," implying at once that there were at least three additional trains following the regular. Under the other, or, let us say, Pennsylvania system, the train would be "4th section of train 46," not so concise a term, nor one conveying so well the idea of its being an additional train, with its men's responsibility.

The general officers of the West Shore came from the Pennsylvania lines originally, and of course are more habituated to the terms used there; but what do they gain by substituting them for other terms so long prevalent in New York? The word "wild-cat" has also been expunged from the time-tables wherever used, and "irregular trains" are mentioned instead. But why?

The Master Mechanics' Convention.

The Convention was held this year at Long Branch, N. J., and has been very fully attended, and many of the subjects brought before the members have led to very full and interesting discussions.

The Convention assembled on Tuesday morning, June 17, and after some routine business, the President, Mr. Reuben Wells, delivered his presidential address, in which he dwelt upon the necessity of economy in the administration and working of railroads in the present time. Railroads had hitherto built up and developed the country, but that era was passing away, and the problem at present before them was to carry freight at the least possible cost. Fuel being the heaviest item in locomotive expenses, economy in that direction was very desirable. The problems as to the best proportions of boiler, grate, etc., were not yet solved. Probably the area of the stack was as important as the area of the grate in a fast passenger engine, and these areas should bear proper relation to one another in order to develop the best effect from a given area of heated surface. The use of slack would effect an economy in the cost of fuel, and tests were required to ascertain whether this was possible, especially as the Wootten system of burning waste anthracite appeared to be successful.

The compound engine had not fulfilled expectations on the Boston & Albany, and though this system had worked well in England, the economy of fuel had not been so great as expected. The link motion still holds its place, and the Joy gear does not give appreciably better results than the link motion, and therefore is not largely used either in this country or Europe. An important economy can be effected by the use of balanced valves, and as it is very desirable to have a good balanced slide valve, the united efforts of the members of the Association should be directed to investigate the question. The Association itself could not undertake experiments, but all might derive benefit from tests made by individual members.

Great diversity of opinion prevailed as to the best valve, the best grate, the best type of locomotive for passenger and freight services respectively, and on many other important questions; but all acknowledged that perfection had yet to be attained. Definite knowledge on these subjects could only be gained by the united efforts of the members of this association.

At the conclusion of the President's address, the Secretary and Treasurer read their reports, from which it appeared that the increase in the number of members during the last year had been 34 per cent., or greater than ever before. The number of active members is now 224, the number of associate members 13, and the number of honorary members 3, making a total membership of 240.

The Secretary, Mr. J. H. SETCHEL, then stated that some questions had been handed in for discussion. The first question was, "At what thickness should steel tires be removed to insure safety from accident by breakage?"

Mr. WM. WOODCOCK (Central Division, Philadelphia & Reading), was led to put this question as lately a driving-wheel had broken on his road, and it was thought, though he did not concur in this opinion, that it broke because the tire was too thin, and had been allowed to run too long. He considered that a tire might be run safely at 1¼ in. thick.

Mr. H. N. SPRAGUE (H. K. Porter & Co.) asked whether there was not a marked difference in the safety of running thin tires on passenger and freight engines.

Mr. A. G. EASTMAN (Southeastern of Canada) agreed with Mr. Woodcock that on a 30-ton engine a tire can be run down to 1¼ in. thick, but on a 40-ton engine, especially in a cold climate, a greater thickness was necessary. The coldness of the winter makes a considerable difference.

Mr. J. H. FLYNN (Western & Atlantic) had found that a tire thicker than 1¼ in. had broken on two occasions under a 37-ton engine in warm weather. There was no flaw in the tire, and no reason could be assigned for the breakage.

Mr. J. D. BARNETT (Midland Division, Grand Trunk) thought the point raised by Mr. Woodcock was whether thin tires caused wheels to break. Thin tires frequently broke, but rarely caused a fracture in the body of the wheel. An engine with a tire only 1⅝ in. thick when turned up, was not safe during a Canadian winter, though it might run in the summer. Some very hard tires require more frequent turning than those of medium hardness. Mr. Dudley, of the Pennsylvania Railroad, came to the conclusion that soft steel was preferable for rails, because a very hard rail was not elastic, did not give, and hence the point of contact with the tire was very small and abrasion took place, while the soft rail would yield under the load and then recover its original position. The same reasoning might apply to tires.

Mr. WOODCOCK stated that while the tire remained intact the wheel broke through the spokes. The rim of the wheel was solid, not cored out. No trouble had been experienced with wheels with hollow rims.

Mr. R. C. BLACKALL (Delaware & Hudson Canal Co.) had several tires 1¾ in., 2 in. and 2¼ in. thick break during the past winter, yet tires only 1¼ in. thick are still running. Any tire that will not turn 1¼ in. thick is thrown away. Does not find that thin tires cause fractures in body of wheel.

Mr. EASTMAN thought the spokes liable to part if the tire became loose.

Mr. CHARLES GRAHAM had two tires 1¼ in. thick break last winter on passenger trains, and could not account for the failures. He had run tires down to 1⅛ in. thick on a 40-ton freight engine with solid rim wheels, without any breakage.

Mr. SPRAGUE thought tires were now made of more uniform quality. The early tires were of uneven quality, and this might account for their different behavior as regards fracture.

Mr. J. N. LAUDER (Old Colony) then moved that one hour each day, from 12 to 1, be devoted to the discussion of subjects selected by any individual member who should open the discussion.

The motion was, after some discussion, put to the meeting and carried.

Mr. SPRAGUE then opened a discussion on the relative merits of pressing or shrinking on tires, advocating the former plan, while the majority of the members present were strongly in favor of the latter.

Mr. M. N. FORNEY: I would like to call attention to the action of the Car-Builders' Association in regard to the standard distance between the backs of tires. There have been a great many methods of laying the guard rail on different lines of railroads, and it was thought important that some standard should be adopted for the distance between the backs of the flanges of their wheels. I think it is also important that there should be a standard for the locomotive department. I would, therefore, move that the standard distance between the backs of tires for tender wheels, locomotive truck wheels, and driving wheels, be four feet five and three-eighths inches, which is the standard that the Car Builders' Association have adopted. It would be desirable to alter the form of the resolution and adopt limits to allow for rough surface of chilled wheels, and say that it shall not be less than 4 ft. 5¼ in., or more than 4 ft. 5⅛ in. I think it is more important to the locomotive department than to the car department, because driving-wheel tires are turned with considerable accuracy, but with rough-cast iron wheels it is important to have some limit. I move that we adopt the standard distance which the Car Builders' Association have adopted.

Mr. LAUDER seconded the motion. He was perfectly willing to make the standard the same as the Car Builders' Association have adopted. His tender wheels are all steel and he can turn them as readily as the drivers and get them to any exact gauge, but thinks where cast-iron wheels are used for tenders and trucks that it should be put in the form of a limit.

The SECRETARY then read the motion: That the standard distance between the backs of all engine and tender wheels shall not be less than 4 ft. 5¼ in., nor more than 4 ft. 5⅛ in.

The PRESIDENT: For my own information, I would like to know what gauge of road is contemplated there.

Mr. M. N. FORNEY: Four feet eight and a half inches.

The PRESIDENT: A great many roads have a gauge of 4 ft. 9 in.

Mr. M. N. FORNEY: It would not conflict with 4 ft. 9 in., because the Pennsylvania limit gauge is now 4 ft. 5¼ in.

Upon Mr. Forney's motion being put to vote, it was declared carried.

The committee appointed to report on "Improvements in Boiler-Construction" presented an exhaustive report, dealing at considerable length with most of the essential items of boiler construction. The conclusions at which the committee arrived are given below in a somewhat abbreviated form.

The points in boiler construction upon which we have arrived at a general uniformity of opinion may be enumerated as follows:

1. All longitudinal riveted joints should be above the water line.
2. Butt or welt longitudinal joints are preferable to single or double lap joints and tend to prevent furrowing at seams.
3. The use of mild steel for all parts of shell and inside of fire-box.
4. The water spaces surrounding fire grate should never be less than three inches, four inches being preferable if possible, the width increasing upwards rather than narrowing, thus securing better circulation, and freely getting rid of the steam as fast as it is formed.
5. Clearance space between flues not less than ¾ in.
6. Disuse of inside ferrules to secure flues in tube-sheet, a practice still common in other countries.
7. Lap-welded iron or steel flues are far preferable to brass or composition tubes.
8. Disuse of solid fire-door ring around fire-door opening.
9. As few holes as possible through shell for connections, cocks, valves, etc., and as many as necessary for washing-out purposes.
10. Dome opening to be reinforced by strengthening plate or double flanging.
11. Rocking grates for bituminous coal.
12. The boiler should be free to move on engine frame, back boiler head braces (even with slotted holes to allow for expansion) being abandoned.
13. Original or construction test by hydraulic pressure through injector, and therefore with warm water, but all subsequent tests by inspection with hand and eye, both internally and externally.
14. Mud should be got rid of by blowing boiler off under full head of steam, and not by providing mud pockets or drums.
15. We see no reason why the practice of using 20 to 30 lbs. increased initial pressure should not become still more general, and the pressure steadily grow higher. Steam is used so rapidly after formation, and is therefore so wet that there is little cause for fear of trouble resulting from the higher temperature of the steam interfering with the smoothness of the working faces of valve and cylinder. This temperature is now increased one tenth in raising steam from 140 to 200 lbs. pressure, and if the full economical value of compounding locomotive cylinders is to be obtained, the pressure must be increased above 150 or 160 lbs., which is the maximum of to-day.

Having called your attention to some of the points in boiler construction upon which we are almost unanimous, we will proceed to call your attention to some other points upon which there is still a great diversity of opinion.

We can settle many of these points. It is desirable that the members present make special note of them for the purpose of discussion at this or succeeding meetings, as it is only by doing so that any definite conclusion can be arrived at.

1. The proper diameter of flue for a given class of coal.
2. The proper clearance of space between flues and their geometrical arrangement.
3. The fire-grate area and proper amount and division of air opening for rapid and thorough combustion of different qualities of coal. Mr. Wells on page 17 of the 15th Report, says that area of live grate should be as small as possible. Mr. Wilder says grate 120 in. long is economical for soft coal. Who can reconcile the difference of opinion?
4. Is the increased first cost and inherent weakness of the wagon-top boiler justified by its value in every-day work?
5. Best point to deliver feed-water into boiler. There are wide differences on this point, and few of us are perfectly satisfied with the common practice.
6. The economical value of fire-brick arches, keeping in mind not only the cost of fuel, but cost and repeated renewal of fire brick, and in some cities the legislation against the smoke nuisance.
7. The relative merits of arched fire bricks, compared with flat bricks, carried on suspended water tubes.
8. The value of each additional foot in length of flues should be ascertained by experiment. If, as many suppose, any additional length beyond eight or nine feet is of no practical use, we had better shorten our boiler barrels, and obtain the same weight and cubical capacity by increasing their diameter.

On our freight engines we can safely lift the centre of gravity very much higher than is being done at present, and even on our passenger engines the limit has not yet been reached. All increase of pressure will tend to lessen

the value of the last few feet of long tubes. If by experiment the heating value of the tubes was ascertained we could readily obtain the value of the fire-box surface by deducting from total heating value of boiler, and thus having two values, we could better adjust the proportion between tube and fire-box surfaces.

The Committee have now placed before you all the drawings and data that they have been able to collect, and having pointed out the different modes of construction, with their views on the subject, we hope that they will be freely discussed.

In conclusion, the Committee wish to extend their thanks to all those who have contributed toward the report, and to Mr. Barnett especially are we indebted for his labor in collecting drawings and data, also Mr. Geo. D. Brooke and E. Denegre, of the Wabash, St. Louis & Pacific Railway, for editing and writing out this report.

Respectfully,

JACOB JOHANN,
JAMES BARNETT,
G. H. PRESCOTT,
WM. FULLER,
S. D. BRADLEY,
} Committee.

After the reading of this report, the convention adjourned till the next day.

SECOND DAY'S PROCEEDINGS.

The paper on "Improvements in Boiler Construction," given above, was then discussed.

Mr. J. D. BARNETT (Grand Trunk) said his experience was in favor of screwed crown stays. On the Grand Trunk these stays had been in use for many years on 150 engines, often outwearing the fire-boxes, and in no case had the direct form of stay given any trouble. Fire-hole plates were sometimes burnt, through insufficient circulation of water, though no mud was present.

Mr. M. N. FORNEY urged the importance of keeping all longitudinal seams above the water-line. This was shown to be essential by the reports of the British Board of Trade on locomotive boiler explosions, and was well understood, and should be generally accepted.

Mr. J. N. LAUDER (Old Colony) said that many think a double-riveted seam lap joint is as good as a butt joint, but in some cases there is trouble from furrowing. His own experience was in favor of lap joint with a single internal welt, as being cheaper and as well protected from furrowing as a double butt joint.

Mr. J. H. SETCHEL (Ohio & Mississippi) was in favor of welt seams. He had found iron fire-boxes to be very durable when using certain kinds of water. On the Little Miami Railroad, some iron fire-boxes had lasted 23 years, using water from the Ohio River.

Mr. LAUDER found steel much superior to iron or copper as a material for fire-boxes, and thought that its failure for this purpose in England must be due to the use of inferior steel.

Mr. H. N. SPRAGUE (H. K. Porter & Co.) thought so too, as he found steel in old English fire-boxes to be quite hard, so that it could not be cut with a chisel.

Mr. FORNEY said that the failure of steel fire-boxes in England could not be altogether due to the bad quality of English steel, as American plates made by Park Bros., of Pittsburgh, when tried on an English line, had run a smaller mileage than English steel plates, both being inferior to copper, and costing more per mile run. It was said that English steel did well on the Grand Trunk. The British Association, which included many of the most eminent English engineers, was to meet at Montreal this year, and he hoped that the American master mechanics would meet them and discuss this question, and give them a hearty welcome.

Mr. SPRAGUE said that a few years ago Park Bros. made their steel too high in carbon for use in fire-boxes, and that was the probable cause of the failure of the steel in England.

Mr. L. D. BERRY (Des Moines, Osceola & Southern) said that a boiler must be kept clean to run a steel fire-box successfully, and preferred iron.

Mr. JACOB JOHANN (Wabash, St. Louis & Pacific), would not believe that the cause of the failure of steel fire-boxes lies wholly in the water, but considers that firing has some influence. High carbon and the method of firing soon destroyed the early steel fire-boxes. We made it a rule that a fire should never be more than 8 in. thick, as he found that a deep fire was prejudicial to the durability of the steel fire-box. He attributed much of his success with steel fire-boxes to this point, for when his neighbors, using the same steel and water, had numerous failures, he never lost a box, though his plates were not annealed.

Mr. F. M. TWOMBLEY was running 300 engines with lime-water, and had not had a cracked steel fire-box for many years, though the early steel gave trouble and was abandoned for copper. In his experience copper lasted only two or three years, cracking and wearing out at the bottom of the fire-box, and it had now been quite superseded by steel.

Mr. SPRAGUE thought a homogeneous material nearly free of carbon the secret of success.

Mr. JOHANN was compelled to use lime-water on his road, and though the flues had to be cleaned of scale every eight or ten months, he had no trouble with the fire-box side sheets, none having cracked in three years on 600 engines, though some crown sheets had given way through being overheated. On the Missouri Pacific half of the steel fire-boxes built 15 years ago were still in service. The steel fire-box of a stationary boiler was entirely destroyed in two and a half years, every sheet being cracked; but on using soft instead of hard water, a fire-box of precisely similar plates, made by the same maker at the same time, was still perfectly good after ten years' service.

Mr. WARREN could confirm Mr. Johann's statement. With hard water fire-boxes will not stand two years, the low carbon steel commencing to fail by cracks ⅛-inch long, starting from stay-holes. The high carbon steel will crack 2 feet at a time. Iron fire-boxes do well with soft water, but no better than steel, being more apt to blister, while steel cracks. The use of hard water causes fire-box sheets to crack. Low carbon steel is preferable for fire-boxes.

Mr. JOHN HEWITT (Missouri Pacific) stated that he had still many engines running with steel fire-boxes put in 15 years ago. About 20 per cent of these boxes had cracked.

Mr. LAUDER advocated double-riveting in the mud ring in order to prevent leakage at corner of fire-box, especially with hard water. A ring 4 in. deep would make a sound job at a trifling extra cost.

Mr. J. P. HOVEY (Rochester & Pittsburgh) indorsed Mr. Lauder, and approved of double-riveting.

Mr. SETCHEL considered that iron fire-boxes will last indefinitely when using soft river water, such as that of the Ohio, Mississippi or White river. He had 56 engines running for 12 years without a single fire-box being renewed. The length of life of a fire-box depended almost wholly on the quality of the water. On the Ohio & Mississippi Railroad the average life had been 11 years, or about 550,000 miles.

Mr. SPRAGUE considered that steel was superior to iron as a material for fire-boxes, as it was stiffer and kept its shape better.

Mr. HOVEY thought steel, iron or copper might each be the best material to use under certain conditions. He had known Sligo iron to become carbonized and hard as steel from use.

Mr. J. S. PORTER (Indiana, Bloomington & Western) put in Otis steel on one side of a box, and Sligo iron on the other, three years ago, using hard water and soft coal, and found steel the better material.

Mr. CHAS. BLACKWELL (Norfolk & Western) was compelled to use some water containing 15 to 20 grains of solid matter per gallon. He experienced great trouble from cracked fire-boxes. Some fire-boxes in engines built at the Baldwin works cracked in from 4 to 12 months. The chemical analysis of steel was important, as it was necessary that the material should be free from sulphur. Where the coal contained much sulphur, the plates, if overheated by deposit at the back, were apt to absorb sulpbur from the coal. Chemical analysis of pieces of plate taken from different parts of a cracked box showed two or three times the percentage of sulphur in the pieces nearest the fire.

Mr. ANGUS SINCLAIR did not think the bad quality of the water explained the failure of steel fire-boxes in England. Probably the steel sheets were too high in carbon, and were not properly annealed. Water was harder in the West than in most parts of England. He had found more trouble from water at Burlington, Ia., than elsewhere, owing to the sulphate of lime in the water. The use of Mississippi River water was favorable to the life of a steel fire-box.

Mr. JOHANN abandoned annealing six years ago. Does not allow a hammer to be used in straightening a sheet, preferring a flattening tool with rounded edges or a wooden maul. All holes are punched and reamed out, instead of being drifted, if holes do not meet. This gives good results, and fire-boxes thus made last as well as those made with annealed plates.

Mr. SPRAGUE does not anneal, but when plates are worked down to a black heat they are reheated and allowed to cool.

Mr. JOHANN thought it would be economical to purify the water before using it in boilers, but had not been able to test this question yet, not having obtained a grant of money from his company for this purpose. He placed a blow-off cock under the barrel as well as on the fire-box, and the deposit was partially blown off four or five times in a trip.

Mr. WARREN said the quality of the water was important. On one end of his line the tubes want tightening after one week's running, and on the other end of the line they will be tight for two years without touching.

Mr. H. M. BRITTON said lime water gave trouble with both iron and steel. Pure water with low carbon steel will give good results.

Mr. WILLIAM FULLER (New York, Pennsylvania & Ohio), finds surface water preferable to well water. His fire-boxes run under five years, but this is partly owing to bad coal, though some of the water has 42 grains of solid matter per gallon.

Mr. BLACKWELL wished to learn of any successful boiler compound for preventing incrustation in locomotives.

Mr. SPRAGUE was using a compound in his stationary boiler with good results. He used Allegheny River water, and this was analyzed, and the compound was specially made to counteract the evil effects of that particular water. It was a mild purgative, which was put in every day, and loosened the scale.

Mr. F. M. WILDER (New York, Lake Erie & Western) said that the quality of water varied so much that no one compound would answer for a locomotive.

Mr. A. G. EASTMAN (Southeastern, of Canada) was using iron tubes exclusively, with a galvanized iron strip drawn down and rolled between tube and sheet, instead of the usual copper ferrule. The tube was not swaged down; this plan had answered well.

Mr. JOHANN uses copper ferrules (cut off from a solid tube) at both ends of the flues, which are not swaged down. The water space allowed is ⅝ inch.

Mr. FORNEY thought that the reinforcing of the boiler barrel where cut away for the dome aperture was a subject which had been greatly neglected in this country. Flanging up the barrel plate does not make up the strength. Mr. F. K. Hain, of the Manhattan Railway, even in his small engines, had trouble with the plates cracking near the dome.

Mr. WILDER had found no trouble arise from this cause if the dome was carefully stayed to the crown bars. He used wagon-top boilers, and had only found one instance of a crack in a shell plate, the crack being due to loose stays.

Mr. SINCLAIR had examined the leaky dome bases on the Manhattan, and measured the boilers when hot and when cold. When under pressure the dome went down and the boiler widened or became oval, throwing a strain on the dome. The shell was therefore too weak, and needed a strengthening ring, which was applied, and prevented any further trouble. As the dome comes down under pressure, the vertical stays are worse than useless.

Mr. AUSTIN (Baldwin Locomotive Works) thought the trouble arose from the boilers having been made too thin in order to obtain a light engine. The barrel was 34 in. diameter and the dome 19 in. The plates were ¼ in. thick, and the flanges were only ⅜ in. thick. Flanging barrel up and dome down does well when the plates are thick enough to stand flanging.

Mr. SETCHEL, in reference to the 12th recommendation of the Committee, found back braces indispensable in jacking an engine up in the shop. The braces then gave vertical stiffness, and without them the frames would be bent.

Mr. JOHANN had found mud drums useless, and the joints were expensive to maintain. He placed blow-off cocks on dished castings on bottom of barrel.

Mr. SETCHEL said blowing off under pressure leads to scale being baked on surfaces of hot plates and flues. A boiler should be cooled gradually, and then blown off. Only a very thin film is then deposited.

Mr. WILDER lets boilers cool by easing the pressure off at the safety valves until the hydrants will overcome the pressure and put the water in. The cooling being gradual, sediment is not baked or burnt on flues and sheets.

Mr. LAUDER believed in an increase of pressure, and considered that 175 pounds to the square inch might be used with safety and economy. Steel rails enable an engine to be made heavy, and some engines now made were weighted with cast-iron blocks in order to secure adhesion, but it was preferable to dispense with this useless dead weight, and increase the power and economy of the engine by having a stronger and heavier boiler of ⅛-in. plates, well fitted to carry higher pressures.

BEST DIAMETER AND LENGTH OF FLUES.

Mr. AUSTIN found varying opinions upon this subject. The Baldwin Locomotive Works increased the size of the tubes in proportion to their length in order to get strength and not choke the flame.

Mr. LAUDER thought that as 2-in. flues outside diameter were generally adopted after wide experience and many experiments, that this was the best size for standard-gauge engines of ordinary size.

Mr. JOHANN had found 1¾ in. tubes choke up on 3 ft. gauge, and put in 2-in., which did well. The diameter depends on the fuel.

Mr. WILDER indorsed Mr. Johann's views.

Mr. SPRAGUE stated that generally his firm in their small engines used 1¾-in. flues for tubes up to 6 ft. long, 1¾-in. up to 8 ft., and 2 in. up to 10 ft.

Mr. WILDER uses grates 9 ft. 6 in. long for soft coal, and 10 ft. long for anthracite. These proportions give good results, the fire-box containing 140 to 150 sq. ft. heating surface. A heavy fire-brick arch, 6 in. thick, is suspended by water tubes screwed into the crown sheet and into the plate below flues. A constant supply of air is admitted through from three to five holes, 2 in. diameter, under the arch. He had also tried a steam jet inducing a current of air, but no definite results have been yet obtained. The long fire-box certainly gives satisfactory results, and he was building no more short fire-boxes.

Mr. BLACKWELL uses a grate 102 in. long, and experiments show an evaporation of 9 and 10 lbs. of water per pound of coal, a great improvement on results obtained with the usual length of grate.

Mr. SETCHEL thought water tubes could not be used with bad water.

Mr. T. J. HATSWELL (Flint & Pere Marquette) found that carrying a brick arch on angle irons led to burnt side sheets, while the use of tubes for this purpose kept crown sheets clean. A brick arch prevented the flues leaking, one engine on his line which had the tubes leaking continually, ran for 9 months after a brick arch was put in. He found no saving in fuel.

Mr. J. H. FLYNN (Western & Atlantic) did not believe in a brick arch.

The discussion then closed and the President announced the committees for the ensuing year to be as under:

Committee on Subjects for Investigation: James Boon, John H. Flynn and George Richards. *Committee on Assessment:* H. L. Cooper, John S. Cook and Chas. Graham. *Auditing Committee:* James P. Gordon, J. N. Lauder, T. B. Twombly. *Committee on Nomination of Officers:* J. N. Lauder, J. F. Devine and Allen Cook. *Committee on Resolutions:* F. B. Miles, Willard A. Smith and Angus Sinclair. *Committee on Next Place of Meeting:* John H. Flynn, George Hackney and A. G. Eastman. *Obituary Committees:* In the case of John McFarland—T. L. Chapman, James Meehan and R. H. Briggs; in the case of Charles A. Smith—John and F. M. Smith.

A discussion on questions proposed by members was then commenced by Mr. EASTMAN, who asked if fire-boxes should not be protected from the weather by a thin sheet-iron covering, even if it were only ¼ in. from the fire-box, in order to save the loss of heat. No member rose to discuss this question.

Mr. SETCHEL: It is generally believed that an oil cup should be placed either in the steam pipe or the water pipe of an injector, so as to secure good service and durability. Which is the proper position for this oil cup? If placed on the water pipe the first overflow from the injector will wash the oil away, and the steam valves will not be lubricated. If placed in the steam pipe it is questionable if the water valves derive any benefit. Some place a pipe from the foot board to the feed-pipe.

Mr. ANGUS SINCLAIR had found injectors working with hard water apt to stop working from scale formed inside. Black oil poured into steam-pipe every few days cut away the scale and cured the difficulty and was preferable to cylinder oil or tallow. If oil is put into steam-pipe and a little steam turned on, the whole injector will be oiled, but oil put in the water is wasted.

Mr. WILLIAM FULLER: We have several hundred injectors on our line with a self-feeding oil pipe attached. They work very satisfactorily.

Mr. J. F. DEVINE (Wilmington & Weldon): What is the best piston packing? I have tried many kinds and have gone back to brass rings.

Mr. SETCHEL: This is an old subject. We had some piston packing with a coil spring, and some with a coil spring with a self-adjusting wedge. Many are using a different kind of metal to that in general use. The simple packing with a T head and the rings sprung over it is the cheapest, and is in general use in the West. If a spring packing is kept properly adjusted, it will give better results than a plain packing.

Mr. H. N. SPRAGUE uses also a solid ring sprung into a groove, peculiar in the way of fitting it up. The ring is compressed before being turned, and mortised so as to spring it together, and then turned both inside and out while under compression. When the ring is cut off it opens out of round, but when it goes into the cylinder it is a perfect circle, with a tendency to spring out. A common practice is to turn the ring larger than the cylinder, then cut out to get your compression.

The discussion on this subject then closed, and the report of the Committee on "Construction and Improvement of the Locomotive" was read. We hope to publish the substance of this and other papers in a future issue of the *Railroad Gazette*.

The President stated that the Committee on Smoke-Stacks and Spark-Arresters had not made a report, and the subject was then referred to a committee for the ensuing year.

The report of the Committee on Shop Tools and Machinery was then read, Mr. Sprague regretting that the members seemed to take so little interest in this question.

The report of the Committee on the Best Material for Locomotive Truck and Tender Tires was next laid before the convention. An interesting discussion ensued. At the conclusion of the discussion the convention adjourned till 9 a. m. on the following day.

THIRD DAY'S PROCEEDINGS.

The report of the Committee on the Best Method of Educating Engineers was read, and a very interesting discussion ensued.

The report of the Committee on Balanced Slide Valves was then read, but owing to the non-arrival of the diagrams with which it was illustrated, the members were hardly in a position to discuss the report very fully, though very valuable information was elicited.

The report of the Committee on the Best Method of Lubricating Valves and Cylinders was read and discussed.

The business next in order was the report of the Committee on the Coning of Wheels, but owing to the small amount of time now at the disposal of the Convention, the reading of the paper was dispensed with, and it was agreed that the report, which contains the views and experience of many of the members, should be printed with explanatory diagrams.

A paper by Angus Sinclair, Associate Member, on the "Economy of Fuel in Locomotives" was then read, and was followed by a paper by Mr. F. W. Dean, Associate Member, on the "Strains on Locomotive Coupling Rods." Neither of these papers were discussed. The Auditing Committee reported that they had examined the accounts of the Secretary and Treasurer and found them correct.

Mr. LAUDER moved that the standards up to the present time adopted by the Master Mechanics' Association be printed in the annual report.

The motion was carried unanimously.

Mr. LAUDER said that the Sellers system of threads had been adopted by this Association as a standard, but many found great difficulty in this respect, as round iron is not of uniform size. It is generally a little over size, consequently the iron must be cut down to make a full thread, the result being

to tear the thread off when the dies are not in perfect order, or to ruin the dies where it had to be cut down $\frac{1}{32}$ in. or $\frac{1}{16}$ in. in order to obtain the standard size. The Master Car-Builders' Association took this matter up and adopted a certain system which he thought a good one. He had adopted it and had procured the gauges. They have adopted a set of gauges made by Pratt & Whitney that all round iron shall be subjected to before it is accepted from the dealer. It has a table made of stamped steel in a very systematic and workmanlike manner. A limit gauge goes with it. One end is $\frac{1}{100}$ in. larger, and the other $\frac{1}{100}$ in. smaller than the true size. The iron must be between these two limits. They could not say to dealers that they shall make $\frac{3}{4}$ in. round iron exactly $\frac{3}{4}$ in. diameter. It would not be practicable; but they could say that it shall not be over $\frac{3}{4}$ in. and $\frac{1}{100}$ in., equal $\frac{75}{100}$ in., neither shall it be $\frac{1}{100}$ in. less than $\frac{3}{4}$ in. or $\frac{74}{100}$ in. A few of the members in Boston notified dealers that all round iron sent will be subjected to this limit gauge. After this explanation he offered this resolution for the consideration of the Association:

"*Resolved*, That the following sizes for gauges for round iron for Sellers standard threads are hereby established by the Master Mechanics' Association as the standard sizes for such gauges, and that it is recommended that all round iron of nominal standard size be made of such diameter that each bar will enter the large or plus end of the gauge intended for it, and will not enter the small end in any way; that is to say, all iron must be so that the big end of the gauge will go on and it must not not be small enough to allow the small end to go on."

Mr. LAUDER said that all railroads that choose to get the gauges can do it, and know that they are getting something that is uniform, and by and by dealers will submit their goods to these tests, and then you will get rid of the nuisance of having iron rolled over size.

The motion was then put to the Convention and carried unanimously.

The PRESIDENT then announced that the next business was the election of officers for the ensuing year.

The SECRETARY then read the report of the Nominating Committee, suggesting the following names for officers:

For President, J. H. Flynn; First Vice-President, J. D. Barnett; Second Vice-President, William Woodcock; Treasurer, George Richards; Secretary, J. H. Setchel; Member of Standing Committee on Subjects, T. B. Twombly, Chicago.

Mr. LAUDER after explaining that any member was perfectly free to nominate any candidate not included in the list, read the following letter which he had just received from President Wells:

"While there is nothing in the by-laws to prevent the election of the same person as President of this association for a second or any number of terms if the members see fit to do so, and as I believe that two terms in succession is as many as it is desirable to elect any person, and that we ought to establish the principle of rotation in office as regards the presidency, and feeling that some might not understand my views on this question, I desire to say to you as Chairman of the Committee, that while I well appreciate the compliments paid me, I will not under any consideration be a candidate for re-election for another term."

Ballots then took place, and the members selected by the Nominating Committee were elected to their respective offices by a practically unanimous vote in each case.

A ballot was then taken, and votes were cast as follows: In favor of Washington as the place of meeting, 45; Cincinnati, 5; Niagara Falls, 1; Montreal, 3.

Washington was duly declared to be the place selected.

Mr. LAUDER then moved that the compensation of the Secretary be increased from $600 to $800, and the motion was carried unanimously.

The PRESIDENT said that the report of the Committee on Subjects for Discussion at our next Convention recommend that the following subjects be investigated:

1. Improvements in boiler construction.
2. New plans for construction and improvements in locomotives.
3. Improvements in valve-gear.
4. Steel castings for locomotives.
5. Best metal for locomotive bearings.
6. Driving-wheel brakes. To what extent is their use advisable?
7. Is the frequent testing of boilers by hydraulic pressure advisable.
8. Smoke-stacks and spark-arresters.
9. Shop tools and machinery.

Mr. H. M. Britton, a past president of the Association, and Mr. Charles Peddle were then elected honorary members.

The usual resolutions of thanks were then passed and the Association adjourned, to meet in Washington on the third Tuesday in June, 1885.

Excursions of the American Railway Master Mechanics' Convention.

The more serious business of the convention was agreeably diversified by some pleasant excursions, in which many of the members and their friends and numerous ladies took part. Fortunately the weather was extremely pleasant, neither too hot nor too cold, and a light sea breeze contributed to the general enjoyment.

On the afternoon of the 18th of June, the second day of the convention, an iron steamer started from the pier at Long Branch and conveyed many of the members and their friends for a cruise to Coney Island, Sandy Hook and the Narrows, where the formidable fortifications that protect New York were inspected with much interest, few of the voyagers having seen New York from this point of view.

In the evening a banquet took place at the Ocean Hotel, some 450 ladies and gentleman being present. No speeches were made, but a very enjoyable evening was spent.

On the afternoon of the 19th, the third and last day of the convention, many of the members accepted the kind invitation of Mr. Chas. E. Parry, of the Baldwin Locomotive Works, and proceeded by special train to Beach Haven, a seaside resort of recent origin, situated some 15 miles north of Atlantic City. The special train consisted of three new first-class passenger cars, and one combination baggage and smoking car, built by the Philadelphia & Reading Railroad. A Mann boudoir sleeping-car, "Il Trovatore," and Mr. G. H. Talbot's private car formed the rear coaches of an exceedingly well appointed train. The engine, No. 173, of the Central Railroad of New Jersey, had not much opportunity of displaying its capability for fast running until the return trip on the following day, when the train was run from Long Branch to Jersey City, over the New Jersey Central route, at a capital pace.

Beach Haven is situated on a long but narrow island, at the north end of which is situated Barnegat Light House. Visitors have consequently to cross the intervening sound by sail-boat or steamer, and on the special train arriving at the shore of the sound near Tuckerton, quite a fleet of sailing boats was found awaiting the arrival of the visitors, and a race soon took place as to which boat should first arrive at Beach Haven, some five miles distant. A small railroad train, consisting of a four-wheel engine with 8 × 10 cylinders, two passenger cars and two flat cars, then conveyed the excursionists to the "Baldwin," a new hotel, built in the style prevalent in the old country when the Pilgrim Fathers' grandfathers were boys. The railroad, which is about half a mile in length, had been opened one week previously, but the hotel was just completed and received guests for the first time. A banquet was given by Mr. Parry in the evening, at which over 300 ladies and gentlemen were present. Mr. Ecclesine, in an eloquent speech, proposed the health of Mr. Parry and thanked him in the name of the assembled master mechanics, both for his hospitality and for his life-long labors in the improvement of the locomotive. The banquet being over, some dancing took place in a most conveniently arranged ball-room attached to the hotel to the strains of a very efficient band from New York. On the following morning the special train, after some delay, started for Long Branch and New York, and at a meeting held on the train, Mr. John H. Flynn presiding, the following resolutions were proposed and carried by acclamation:

"*Resolved*, That the thanks of the American Railway Master Mechanics Association are due and are hereby most heartily tendered, to Mr. Charles T. Parry for his kind invitation for the members and their friends to visit Beach Haven, and for his splendid hospitality and generous entertainment of them while there; to Mr. J. E. Wootten, General Manager of the Philadelphia & Reading Railroad; to Mr. Blodgett, Superintendent of the New Jersey Southern Railroad; to Mr. J. J. Pharo, Superintendent of the Tuckerton Railroad, and to Mr. W. W. Stearns, Superintendent of the New Jersey Central Division, for courtesies in permitting them to travel by special train; to Mr. W. Woodcock for his indefatigable labors to promote the comfort of those attending the meeting; to Mr. Mann, of the Mann Boudoir Car Co., and to Mr. Talbot, for kindness and courtesies in placing their private cars at the disposal of members."

Southern Railroad Gauges.

The New Orleans *Times-Democrat* has the following to say editorially on the subject of a change by Southern railroads to the standard gauge:

"We sincerely trust that the discussion now going on in this connection will result in something practical and definite. It has long been a recognized fact that the South is at a very great disadvantage on account of the difference between the railroad gauges here and at the North. The change takes place at the Ohio River, and it amounts to virtually destroying our rail connections. With the exception of the Illinois Central, there is not a road leading out of New Orleans or any other great Southern city which can transact business upon anything like favorable terms if it involves forwarding over a Northern or Western road. Our freight cars cannot be hauled on roads north of the Ohio without the tedious and expensive ceremony of changing trucks, or the equally slow and costly process of breaking bulk and transferring the entire cargo. In either event, it amounts to a ruinous interruption of traffic. It acts like another Chinese wall, cutting us from the outer world, or at least rendering intercommunication so tedious and so troublesome as to consume the pleasure as well as the profit of trade.

"In recognizing the significance of the situation and in promptly interposing a remedy, as they did three years ago, the management of the Illinois Central Co. took the lead in railway emancipation in the South. Of course there was considerable preparation for it in advance, but, when the appointed moment came the change of gauge over some 600 miles of track was made as if by magic. The work began as the evening north-bound train from New Orleans passed up, and it progressed almost as rapidly as the train itself traveled. By 12 o'clock on the next day the gauge was reduced to standard width from New Orleans through to Cairo, and the track was in as complete order for business as though nothing had occurred at all. It was a wonderful exhibition of the effectiveness of labor, thoroughly organized and intelligently handled. And the moral of it is that what the Illinois Central people can do is equally within the reach of the Louisville & Nashville, the Northeastern, and all the great Southern trunk lines whose Northern and Western connections are rapidly becoming so extensive and so important."

The Relation of Railroad Wheels and Rails to Each Other.

[A paper by Matthias N. Forney, Read at the Annual Convention of the Master Car-Builders' Association, June 11, 1884.]

(CONTINUED FROM PAGE 462)

One of the difficulties which seemed to stand in the way of the adoption of the two forms of treads and flanges which were proposed by the Committee last year was that the one for cast-iron wheels had what was substantially a cylindrical tread, whereas the other, for steel-tired wheels, was coned. There appeared to be enough members opposed to coned wheels to defeat the form of tread proposed for steel tires, and a sufficient number of believers in coning to defeat that proposed for cast-iron wheels.

The relative advantages of coned and cylindrical treads of wheels has been in dispute ever since railroads were first built. In the fourth and fifth annual reports of the Baltimore & Ohio Railroad for the years 1836 and 1837 the subject was discussed at great length, and articles on the subject are now frequently published in the technical papers. Without an elaborate and expensive series of experiments it is perhaps impossible to prove that either coned or cylindrical wheels are the most advantageous. It may be said, however, that whatever advantages may accrue from the use of coned wheels is soon lost, because the cone of the treads is rapidly worn away, and the wheels then become either cylindrical in form or approximate thereto, or get what may be called reversed conicity. It is also true that nearly all who have investigated this question are agreed that cylindrical wheels are best on a straight track, and that it is on curves alone that coned wheels have any advantage.

Another objection to the use of coned wheels is that unless the rails are inclined a coned wheel-tread will bear only on the inner edge of the rail. This is illustrated by figs. 19, 20, 27 and 30.* The latter represents a section of the rail-head and wheel-tread and flange in use on the Philadelphia & Reading Railroad. The black surface represents the metal which must be worn away before the wheel will bear on the whole width of the rail. It will be seen that when the rails and wheels are new, the latter bear on less than half of the surface of the top of the rail. That the rails are actually worn as indicated by the black surface is shown by fig. 32, which is a section of a worn rail which was laid in 1875 in a straight part of the Reading Railroad, and was taken up in 1882 after a tonnage of about 105,000,000 tons had passed over it. By referring to fig. 30, it will be plain that new rails, of the form represented, will wear the wheels to a form indicated by the dotted line. If, then, we take a wheel worn to this shape and put it on a rail worn as shown in fig. 32, we will have the condition of things represented in fig. 31.

* Figs. 1-29 will be found in the preceding number of the *Railroad Gazette*, pages 459, 460 and 461.

Fig. 33 is a section of the head of a rail laid on a straight part of the Reading track in 1867, and at the time this section was taken a tonnage of 176,000,000 tons had passed over it. The rail had been reversed "to equalize the wear." If a rail has been worn by coned wheels, into the form shown by fig. 32, and is then reversed, the wheel and rail would then bear the relation to each other shown in fig. 34. It will be seen that the surfaces in contact are extremely small. Under these conditions the wear of both wheel and rail must be very rapid. On British roads, where wheels are ordinarily coned more than they are here, the rails rest in cast-iron chairs, and these are made of such a shape that the rail is inclined, so that their top surfaces will have the same inclination as the surface of the coned wheels. Attempts have been made in this country to "spot" the crossties, or give the surface on which the rails rest an inclination, so that the top of the rails and the treads of the wheels will coincide with each other, but owing to the cost, inconvenience and other objections to this practice, it has been generally abandoned.

But even if the rail is inclined so that the top of the rail will conform to the tread of the wheel as shown in fig. 39, there is then the objection that the diameter of the wheel at *A*, where it comes in contact with the outside edge of the rail, is, with the amount of conicity represented, about $\frac{7}{16}$ in. less than at *C*, where it is in contact with the inner edge; so that when running on a straight line or on the outside rail of a curve, some portion of the tread in contact with the rail must slip. The difference in circumferences at *A* and *C* is $1\frac{3}{8}$ in. so that during each revolution there must be that amount of slip at either *A* or *C*. It is true that the portion of the wheel at *B* in contact with the centre of the rail might roll without slipping, but in that case there would be a backward slip at *C* of $\frac{11}{16}$ in each revolution and an equal amount forward at *A*. It is also true that the cone of the wheel which is illustrated is excessive, but the evils explained are of the same character with any coned wheel, but in proportion to the amount of conicity of the wheels.

The argument which is used in favor of coned wheels is that in going around a curve the wheels on the outer rails roll outward so that their flanges are in contact with the rails, and consequently their treads bear on the rails at a point near the flanges, where the diameter is largest, and that the wheels on the opposite side bear on the rails at a point some distance from the flange, where the diameter is smaller. During one revolution of the axle, therefore, the outside wheel is supposed to advance further than the inside one, which has a tendency to cause the two to roll in a curved path. In reply to this argument it is said that if each of the axles could assume positions which would be radical to a curve, it would be true that they would roll in a curved path, but that when they are attached to a frame which holds them both in such positions that their centre lines are always parallel, that the argument loses much, if not all, of its force, because, under these circumstances, the wheels are not free to roll in a curved path. It is said even that a model consisting of a pair of axles, held parallel to each other in a frame similar to a truck-frame, with four wheels, of which the two on one side are larger in diameter than those on the opposite side, will not move in a curved path if allowed to roll freely down an incline. In order to test this, the writer had a model made, which is represented by figs. 35-37. The wheels on one side were $1\frac{7}{8}$ in., and those on the other $1\frac{5}{16}$ in. in diameter. The axles were held in position and turned on pointed steel set screws, *A.A*, and a series of holes, *bbb*, were drilled in the frames, *CC*, and tapped to receive the screws, so that the two axles could be spread a distance of 5 in. apart from centre to centre or brought within $1\frac{1}{2}$ in. of each other. This model was weighted with a cast-iron weight, *M*, and allowed to roll freely on a sheet of drawing-paper, which was stretched perfectly smooth on a drawing-board. The wheels were rounded on their treads so that they could move freely laterally. A pencil, *P*, was attached to the under side and at the centre of the model, so as to bear very lightly on the paper. The axles were then placed at different distances and the board was given just sufficient inclination to cause the model to roll down the incline. The pencil then drew a line which marked the path in which the model rolled. A single pair of the wheels alone rolled in a circle of 26¾-in. radius. The results of the experiments with the model were as follows:

A single pair of wheels alone rolled in a curve of					26¾	in. radius.
With 2 axles,	1½	in.	apart,	the model rolled in curve	33½	in. radius.
"	2	"	"	"	45⅜	"
"	2½	"	"	"	66¼	"
"	3	"	"	"	87⅛	"
"	3½	"	"	"	125½	"
"	4	"	"	"	168⅞	"
"	4½	"	"	"	239½	"
"	5	"	"	"	321⅝	"

The model compared with a full-sized truck, was made to a scale of $\frac{1}{2}$ in. = 1 foot, or $\frac{1}{24}$ of full size. The wheels on each axle, therefore, represented full-sized wheels of 34½ and 31½ in., or a difference of 3 in. in diameter. If we convert all the dimensions of the model and the results of the experiments into the full size which they represented, they would indicate that a single pair of wheels in the same axle, with a difference of 3 in. in their diameters, will roll in a curve of 53½ ft. radius. Two pairs of such wheels, if the axles are held parallel, as in the model, would roll in the curves specified in the following table:

Axles	3	ft.	apart	will roll in a curve of	67-ft. radius.
"	4	"	"	"	91½ "
"	5	"	"	"	133 "
"	6	"	"	"	174½ "
"	7	"	"	"	251 "
"	8	"	"	"	2373¾ "
"	9	"	"	"	479 "
"	10	"	"	"	643¼ "

From figs. 1 to 15 it will be seen that the coning of the wheels represented varies from $\frac{3}{32}$ of an inch to $\frac{13}{32}$ in 3 in. on one side, so that there is a difference of $\frac{3}{16}$ in. to $\frac{13}{16}$ in. in diameter in 3 in. of length of the tread of the wheels, or an average of about $\frac{5}{16}$ in. If it is remembered that wheels ordinarily have only about $\frac{3}{4}$ in. end play on the wheels, it will be seen that the actual difference in the diameters in which wheels having $\frac{5}{16}$ in. cone in 3 in., is in the following proportions:

$$3 : \tfrac{3}{4} :: \tfrac{5}{16} : \tfrac{5}{64}.$$

That is, there is a difference of only $\frac{5}{64}$ of an inch in the diameters in which ordinary coned wheels roll in passing around curves. If, then, with a difference in diameter of 3 in., two pairs of wheels will roll in the curves given in the last table, then by a simple proportion, we can calculate the curves in which wheels having $\frac{5}{64}$ of an inch would roll, which would be as follows:

Axles	3	ft.	apart	will roll in a curve of	2,572.8 ft. radius.
"	4	"	"	"	3,513.6 "
"	5	"	"	"	5,107.2 "
"	6	"	"	"	6,700.8 "
"	7	"	"	"	9,638.4 "
"	8	"	"	"	12,969.6 "
"	9	"	"	"	18,393.6 "
"	10	"	"	"	24,700.8 "

These figures show how very little influence the ordinary coning which is given to car wheels has in causing them to

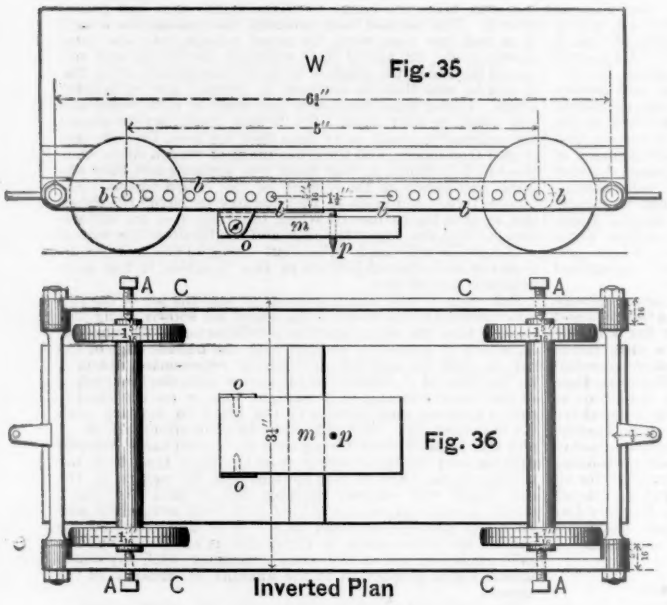


Fig. 35

Fig. 36

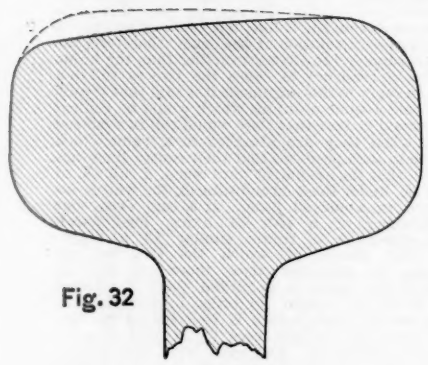


Fig. 32

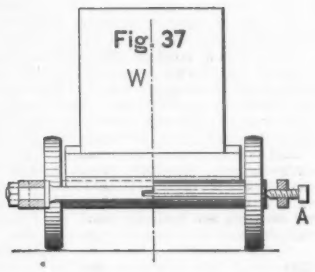


Fig. 37

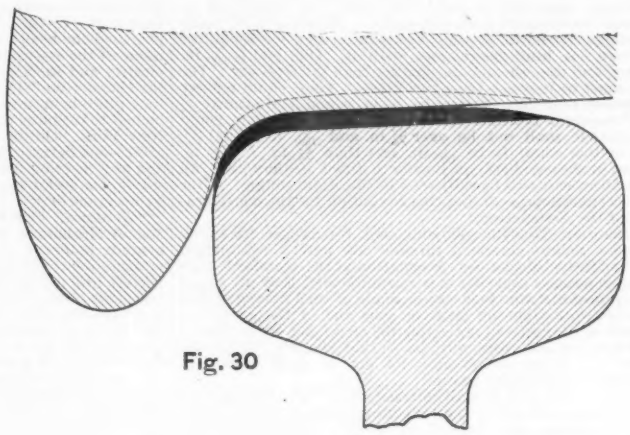


Fig. 30

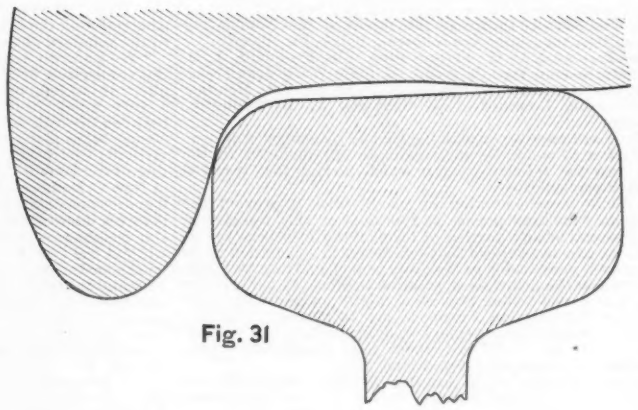


Fig. 31

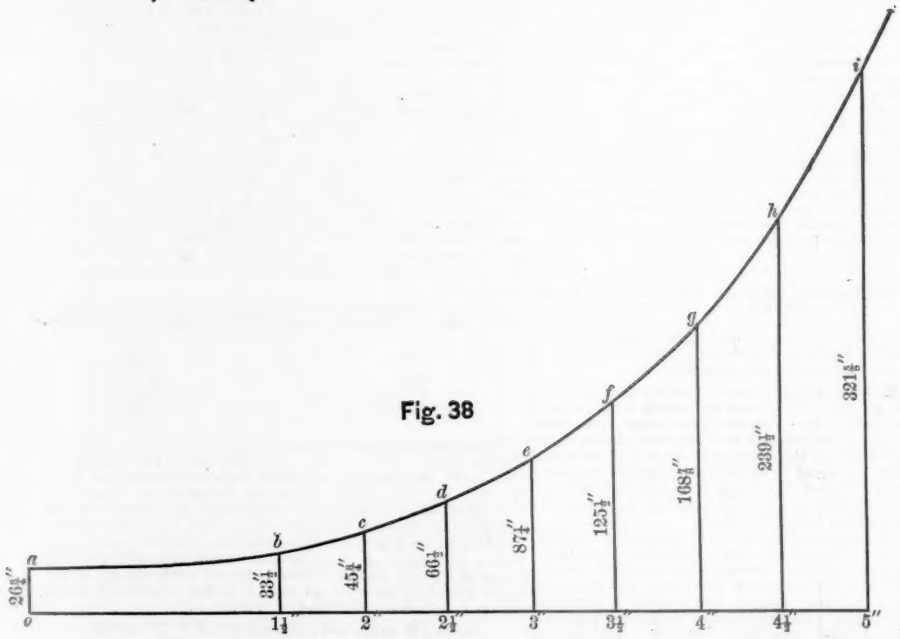


Fig. 38

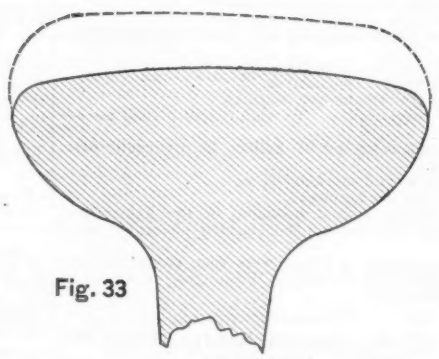


Fig. 33

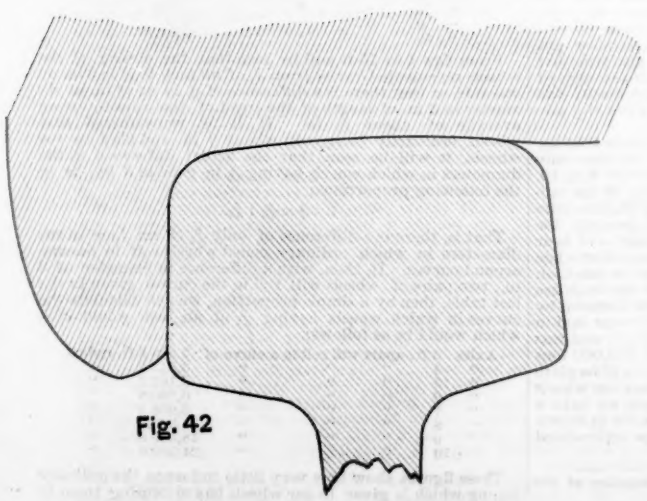


Fig. 42

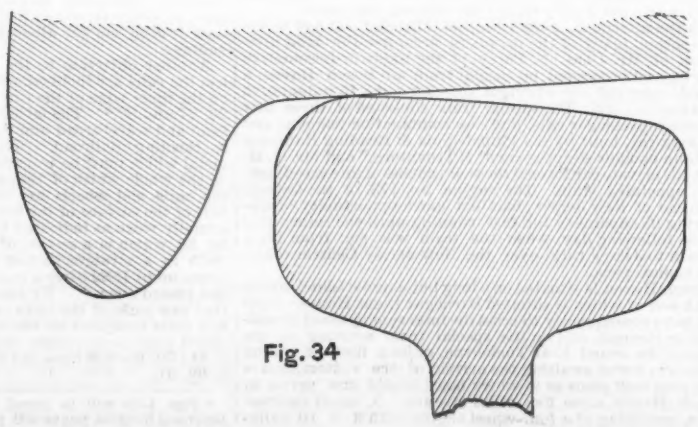


Fig. 34

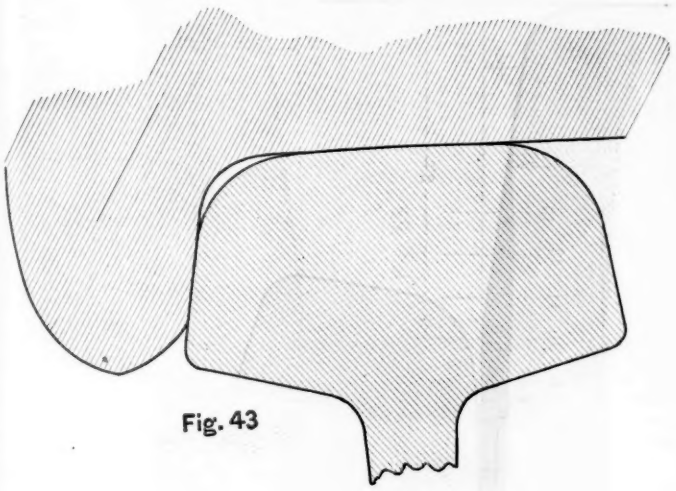


Fig. 43

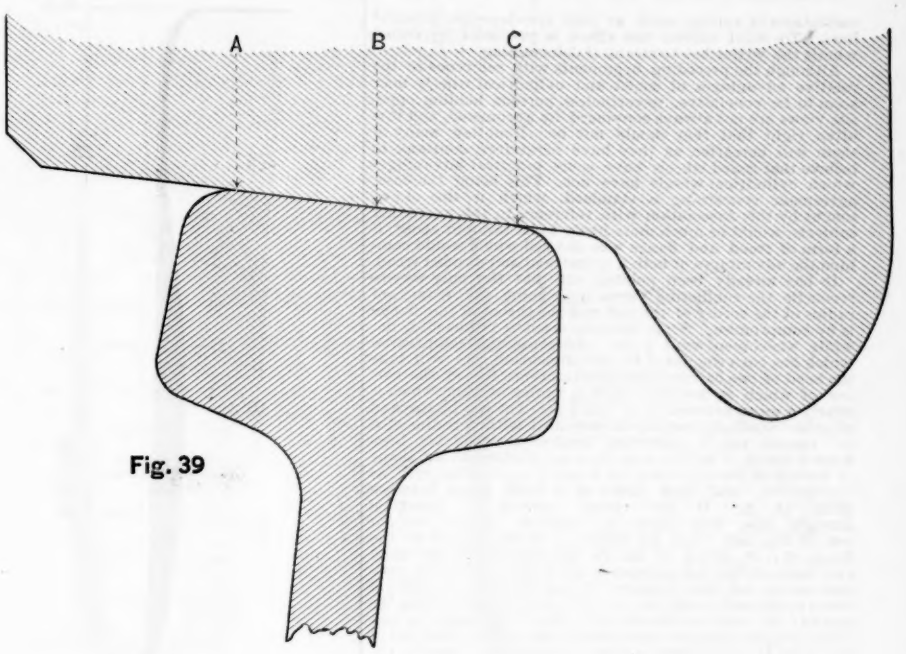


Fig. 39

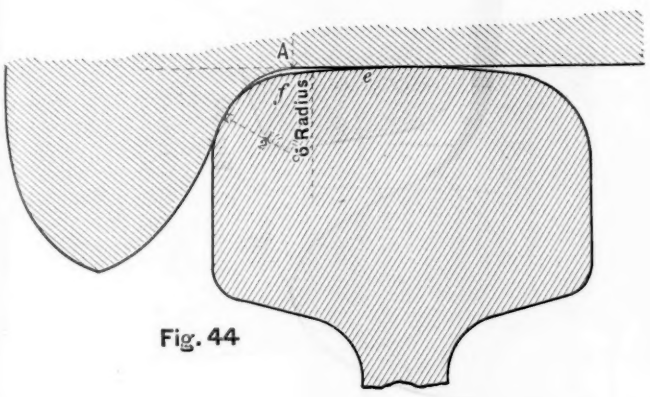


Fig. 44

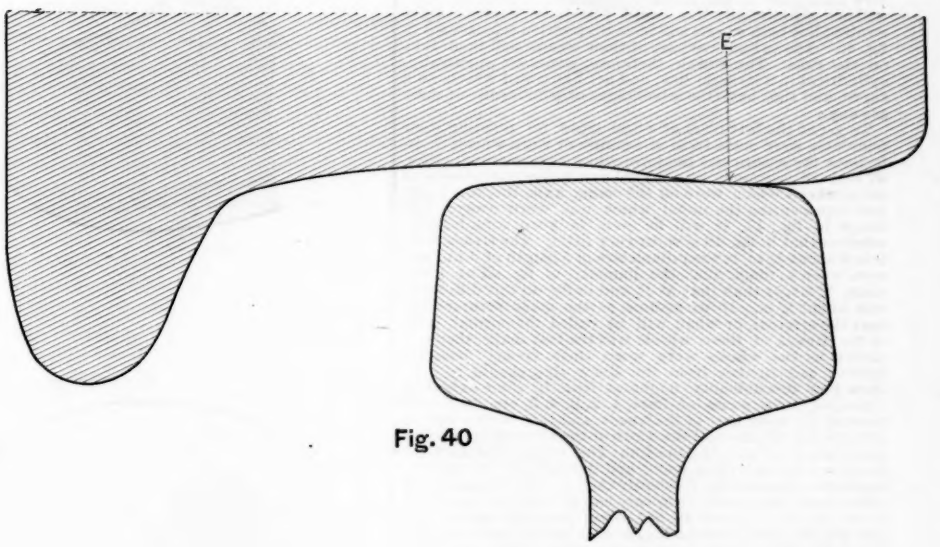


Fig. 40

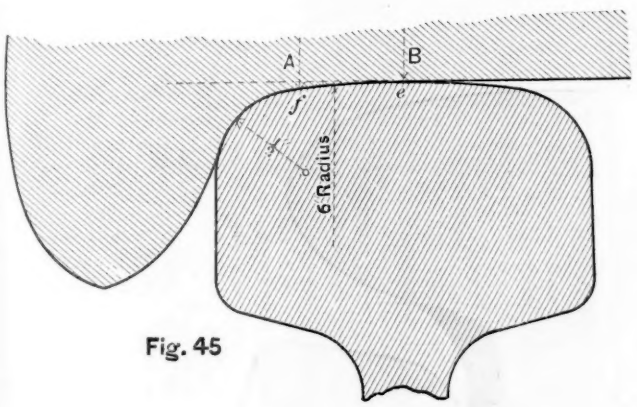


Fig. 45

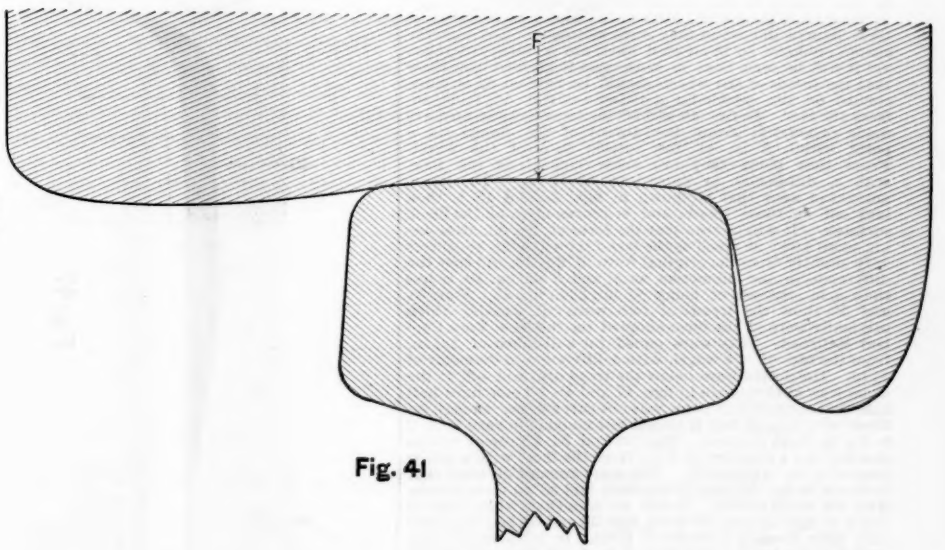


Fig. 41

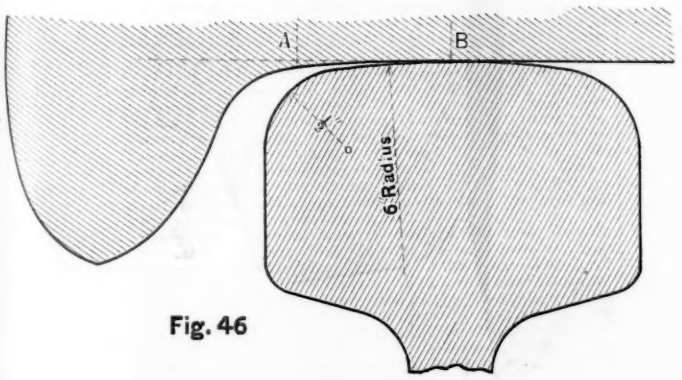


Fig. 46

roll around curves. Such wheels would cause a freight-car truck spread 5 ft. apart to roll in a curve of 5,107.2 feet radius and a six-wheeled truck, spread 10 ft., would roll in a curve of 24,700.8 feet radius, in about 4¾ miles. In curves of shorter radius than this the wheels must be moved laterally by the pressure of the flanges against the rails. The theory that a cone will roll in a curve as freely as a cylinder will roll in a straight line is very attractive, so much so that those who have used it in favor of coning car-wheels have lost sight of the fact that two cones with their axles held parallel with each other are not free to act as one will when entirely free. The fact, too, that the tendency which a cone has of rolling in a circle is counteracted by spreading two parallel axles further apart, has also been lost sight of, or perhaps has not been known. In order to show how great the influence of increasing the distance is in overcoming the influence of the conicity of the wheels, the results of the experiments with the model, which have been described, have been plotted in fig. 38, where *o* 5 is a horizontal base line on which the distance *o* ½, *o* 2, *o* 2½, etc., between the centres of the axles, has been laid down. On the perpendicular from o, the radius *o a* of the curve in which the single pair of wheels alone rolled, was laid down on a scale of $\frac{1}{100}$. From 1½ the distance 1½ *b* equal to $\frac{1}{100}$ of the radius of the curve in which the model rolled when the axles were 1½ inches apart. From the other points in the horizontal base line the radii of the curves in which the model rolled with the axles at different distances apart were laid down in the same way. Through the extremities *a*, *b*, *c*—*i* of these perpendiculars, a curve was drawn which represents graphically the rate at which the radii of the curves in which the model rolls, with the axles at different distances apart, approximate to infinity. No doubt the nature of this curve is capable of mathematical expression and analysis, but this is not a suitable occasion for such an investigation, even if the author of this paper was competent to make it. Without being analyzed, however, the diagram indicates all that it is now necessary to show, which is, that the cone of wheels is of very little inportance when the wheels are spread a considerable distance apart.

Not only is this the case, but, as has been stated before, in service the cone of wheels is quickly worn away, and after a given amount of wear a reversed conicity results, so that the diameter of wheel on the inside of the curve when it bears on the rail has a larger diameter than the one on the outside. Figs. 40 and 41 represent sections of two wheels in the same axle which were worn to this shape on the New York Central Railroad. They are shown in the positions they would occupy on outer and the inner rails of a curve of which the gauge has been widened a half-inch. The sections of the wheels were drawn with templates cut so as to fit the tracks of the wheels accurately. It will be seen from fig. 40 that the diameter of the wheel at *E*, where it bears on the inside rail, is considerably larger than that of the opposite wheel, fig. 41 at *F*, where *it* bears on the outside rail, so that the wheel which should have the largest diameter has the smallest, and *vice versa*.

From what has been said, then, it may be inferred:

1. That the advantage which results from coning wheels is very slight and of little practical importance.

2. That the advantage of the cone which is given to wheels is very temporary, as the conicity is soon worn away.

3. That the tread of a coned wheel has very little bearing surface on the rail, and therefore it wears the rails and is worn by them very rapidly unless the latter are inclined so that their tops conform to the shape or position of the tread.

4. If the rails are inclined, then some portion of the treads of the wheels in contact with them must slip on a straight line, and on the outside rails of curves which causes increased wear and resistance.

5. It is also asserted that coned wheels produce violent

oscillations of rolling stock at high speeds and on straight lines. To what extent this effect is produced by coned wheels the writer has no means of determining.

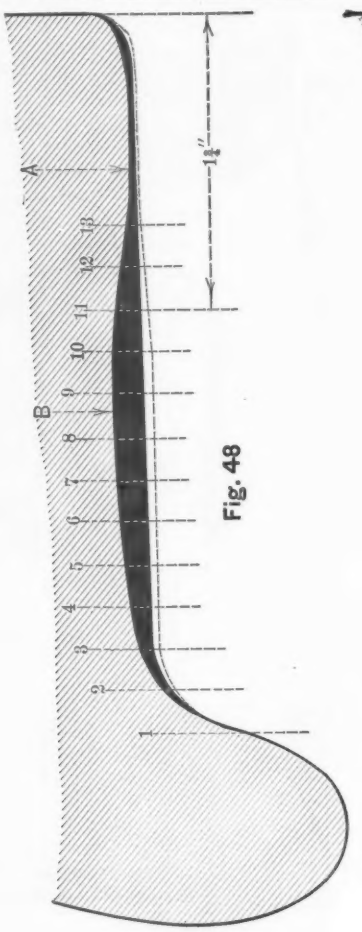
Although the preceding arguments with reference to the relative advantages of coned and cylindrical wheels may seem to be conclusive, nevertheless, persons holding opposite views are not always convinced by arguments, and it is often right that they should not be. Doubtless many of them will hereafter, as they have heretofore, continue to believe that coned wheels have some practical advantages which cylindrical wheels have not. This being the case, agreement concerning a standard, which is the object sought by this Association with reference to this and other subjects, would be much more likely to be brought about, if a form of tread and flange was devised which would combine the advantages of both a cylindrical and a coned tread.

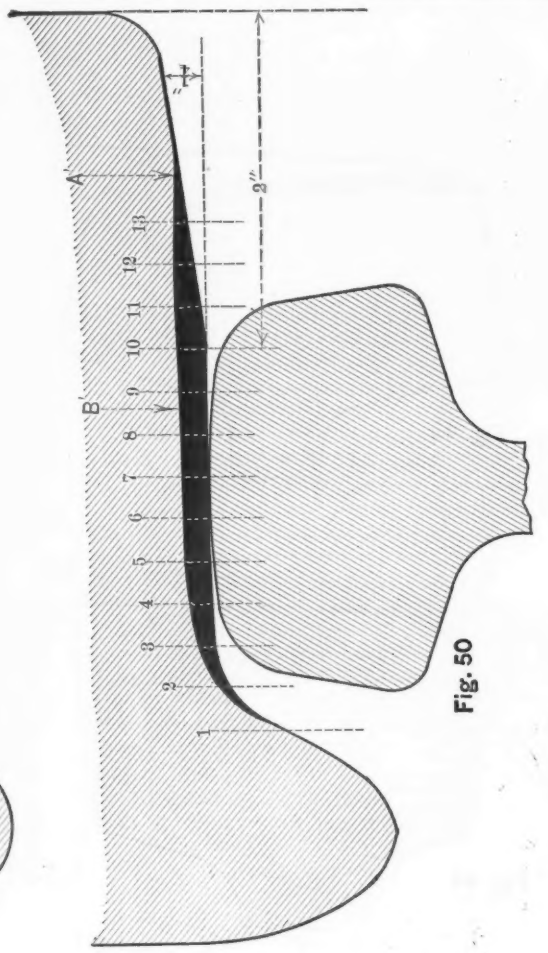
It has already been pointed out that the only way to reconcile the conflicting views concerning the length of radius of the corner of the rail and the throat of the flange is by compromise. Some rail-men want a radius of $\frac{5}{16}$ in., while wheel-men want $\frac{3}{8}$ in. Adopting the compromise which has been suggested for this dimension, we will take the head of one of Sandberg's rail sections, fig. 44, the corner of which is described with a radius of $\frac{1}{4}$ in., which is nearly a mean between $\frac{5}{16}$ in. and $\frac{3}{8}$ in. The top of this and all other Sandberg sections is described with a radius of 6 in. On this rail, a cylindrical tread of a wheel has been drawn, which, it will be seen, does not conform to the shape of the top of the rail when the flange is against the rail, as represented, and that there is a little space between them at *f*. If the tread, instead of being a straight line, was made to conform to the curved top of the rail, from its centre, *e*, to the throat of the flange at *f*, as shown in fig. 45, not only would the tread and flange fit the rail accurately when they are in the position shown, but the diameter of the wheel at *A*, where it bears on the rail, would be larger than it is at *B*, where the tread of the wheel is cylindrical. When the flange of one wheel is in the position represented, that in the other end of the axle is some distance from the rail, and therefore the cylindrical part of its tread bears on the rail. It is therefore plain that if the treads are formed as described they will act substantially like coned wheels on curves. On a straight line both wheels will be in the position represented in fig. 46. The cylindrical part of their treads will then bear on the rails. The wheels, therefore, would be, practically, cylindrical in a straight line, and act like coned wheels on a curve, and thus have the advantages of both forms—if there are any.

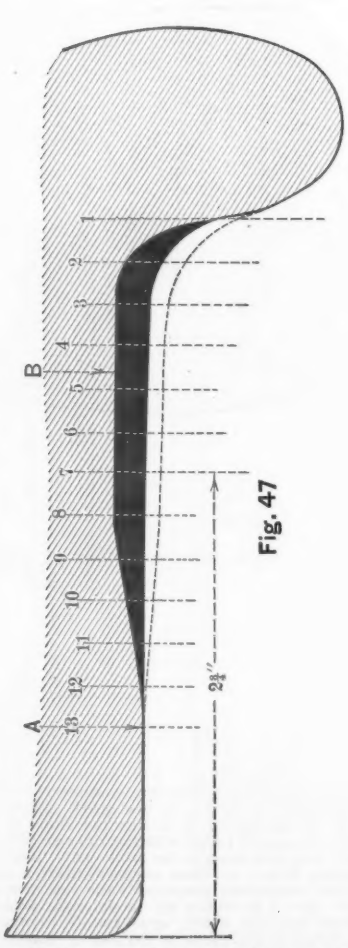
To get at the best form of wheel tread for resisting wear templates were made from a number of worn wheels to determine the nature and the form which they assume. Figs. 47 and 48 represent two actual and typical specimens of worn wheels which were on the same axle, the black surface representing the metal which was worn away. The flange in fig. 47, it will be seen, is worn considerably, whereas that in fig. 48 is worn very little. The treads were coned about $\frac{1}{16}$ in. in their diameters in a length of 3 in., and were worn so much that the diameter of fig. 47 at *A* was about $\frac{5}{8}$ larger than that at *B*, and in fig. 48 this difference was about $\frac{1}{4}$ in. If we assume, as the manufacturers did, that the original, or what will be called the normal, form of the treads of these wheels was the best shape, then evidently as the wheels were worn their treads departed further and further from the shape they should be. To show how this difficulty might at least to some extent be remedied, let a series of lines, 1, 2, 3, 4, 5, etc., be drawn through the worn part of the treads, and then with a pair of dividers lay off one-half the width of the worn surface below the tread, as indicated by the dots. Then suppose a dotted line be drawn through these points and that wheels be made to conform to this outline. Evidently their treads, when new, will differ from the normal form only half as much as the wheels shown in figs. 47 and 48 did, when they were worn out; and it is also plain that during the first half of their wear the proposed wheels would be approximating closer and closer to the normal form, and that with an amount of wear equal to that shown in figs. 47 and 48, they will differ only half as much from the normal form as the wheels represented in these figures did when they were worn out. Although the shapes produced by the dotted lines are a little irregular, yet it will be seen that in both cases the dotted lines show that the treads of the wheels should be beveled off or made conical on the outside for a distance of from $1\frac{3}{4}$ to $2\frac{3}{4}$ in. from the face. In figs. 49 and 50 the treads represented are made cylindrical from the throat of the flange to a point within 2 in. of the outside face of the wheel. From that point they are made conical to the face, with a difference in diameters of $\frac{1}{4}$ in. The same amount of wear that is shown in figs. 47 and 48 is then laid out on those treads, and is represented by the black surfaces. It will be seen that the form of fig. 50, after being worn away as much as the tread shown in fig. 48, differs very slightly from the original form of fig. 48, and that the difference in the diameters at *A'* and *B'* of fig. 49 is less than $\frac{3}{16}$ in., instead of being $\frac{5}{8}$ in., as in fig. 47. Figs. 51 and 52 show the treads of two worn-out wheels, which originally were of the form adopted on the New York Central Railroad. They were coned for a distance of $1\frac{5}{8}$ in. from the face of the wheel, with a difference in diameter of $\frac{5}{8}$ in. The dotted lines below the tread are laid off in the same way as they were in figs. 47 and 48. These lines indicate that the bevel or cone was not carried far enough on these wheels, and that it should be extended inward from 2 to $2\frac{1}{4}$ in. from the face. Figs. 53 and 54 represent treads beveled for a distance of 2 in. from the face, with a difference of $\frac{1}{16}$ in. in diameter. The same amount of wear that is shown in figs. 51 and 52 was then laid off on these treads, with the result shown. It will be seen that, when worn as much as figs. 51 and 52 were, figs. 53 and 54 had departed very little from a cylindrical form. It is therefore concluded that a bevel extending 2 in. from the face of the wheel would be about right. In order to err, if anything, on the side of conservatism, the amount of bevel proposed for a standard form of tread is $\frac{3}{16}$ in. on each side, or $\frac{3}{8}$ in. in the diameter of the wheel.

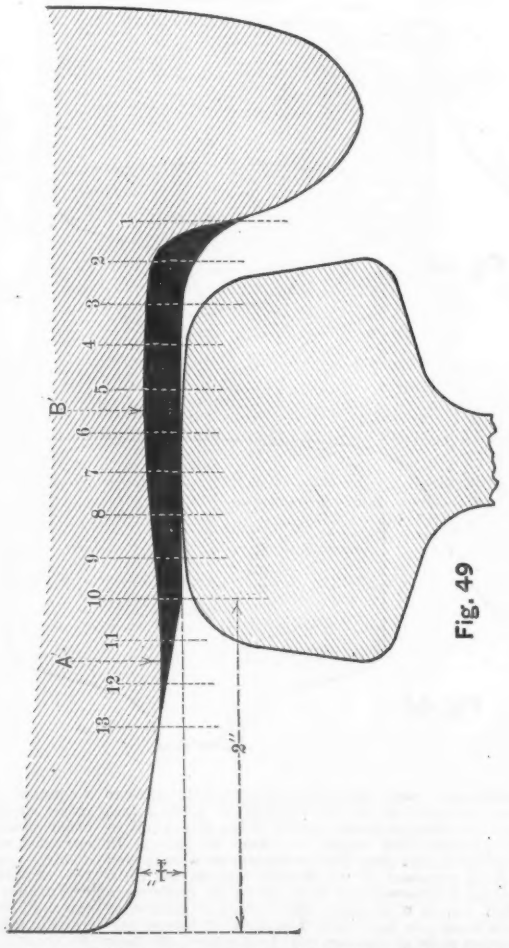
Fig. 55 would then represent the form of tread and flange which has been deduced by the preceding reasoning. From what has been said, and from the engravings accompanying this paper, it will, it is thought, be plain that this form of tread and flange will be suited to existing patterns of rails as well as, or better than, any of those illustrated in figs. 1 to 18. If, however, the heads of rails were made like the Sandberg sections, that is, with corners curved with a radius of $\frac{1}{16}$ in., and their tops described with a radius of 6 in., they would be better suited to the proposed form for the treads and flanges than most of the existing rails now are. In order to bring about this change it seemed desirable that the attention of those who are in charge of the permanent way, and who determine the forms of rails which are used, should be called to the subject; and, as Master Car-Builders are noted for their modesty, the writer, who is neither a car-builder nor an engineer of permanent way, has ventured to make a suggestion of this kind.

It will be remembered by most of the Car-Builders who were present at the last annual convention that there was then a very warm discussion, with reference to the question of a standard distance between the backs of the flanges of









wheels 4 ft. 5⅜ in. was finally agreed upon, and was afterward submitted to letter ballot, and was adopted as a standard by the Association. One of the difficulties, however, which stood in the way of acting intelligently was that those in charge of the permanent way departments of the roads had not agreed upon any uniform practice regarding the gauge of rails, location of frogs, guard-rails, etc. In preparing this paper, it therefore seemed to the writer that the first thing to do was to learn what the actual practice of different engineers and road-masters really is. With the advice and consent of your President, the circular herewith was prepared and was sent to the managers, engineers and car-builders of all the roads in the country. The replies which have been received have been tabulated, and are given in the table appended to the paper. From the table it will be seen how much variation there is in the laying of track on different roads.

A circular was also sent to the car-builders, who are members of this Association, asking them how much the distance between the backs of the flanges of car-wheels varies in practice from the standard distance—4 ft. 5⅜ in.—which has been adopted by the Master Car-Builders' Association, and requesting them to give the greatest and least distance between the backs of flanges of wheels which they have measured under foreign cars. Candor compels me to admit that the latter circular received much less attention from car-builders than the former one did from the civil engineers and road-masters. Fourteen replies were all that were received from the car-builders. The following table will give the substance of the replies.

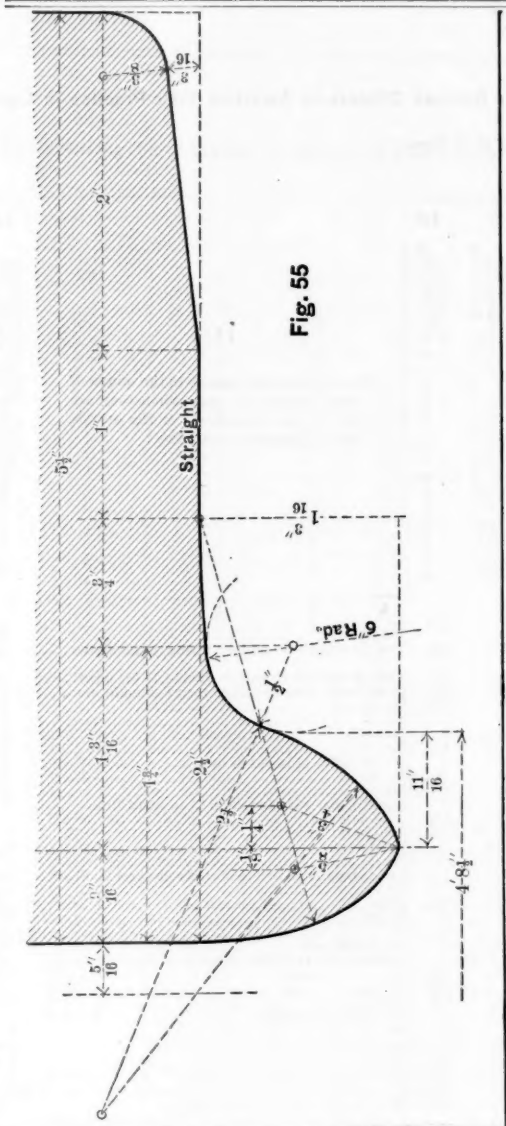


Fig. 55

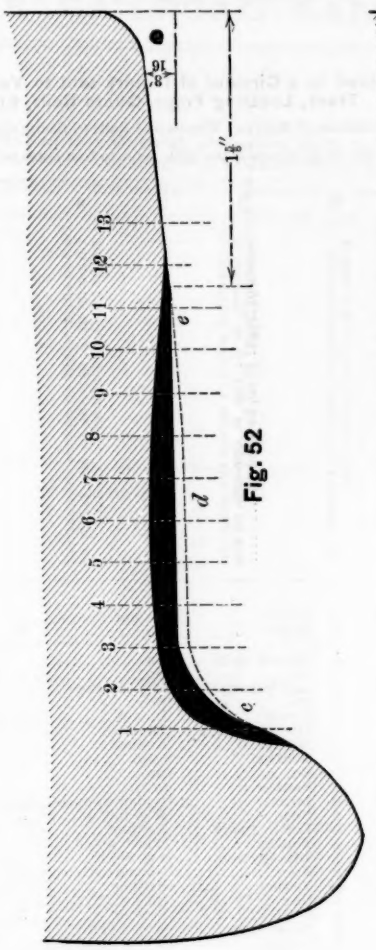


Fig. 52

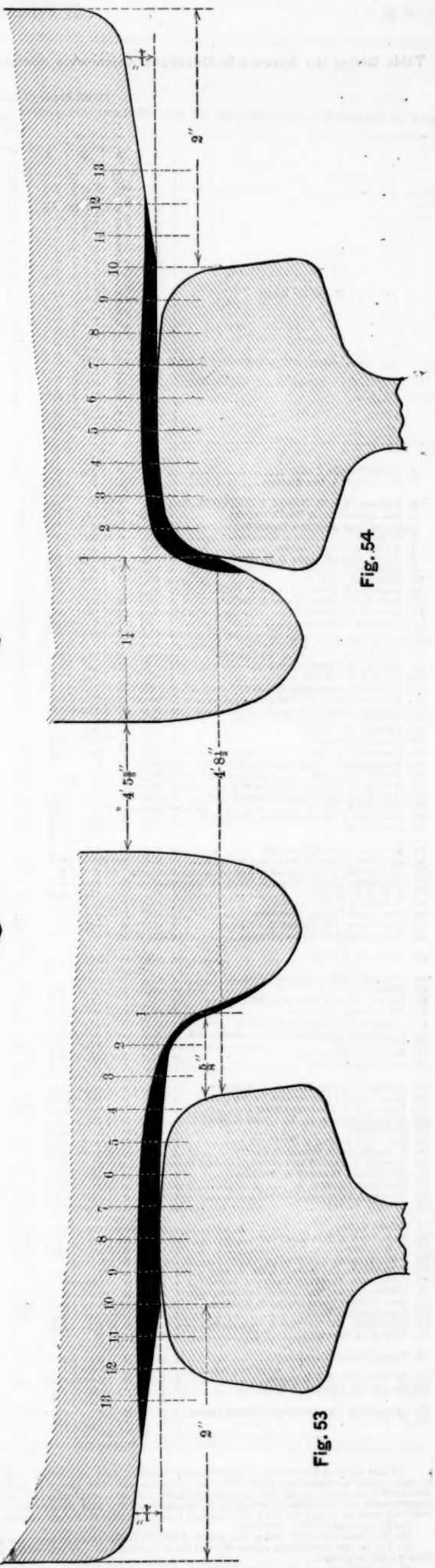


Fig. 54

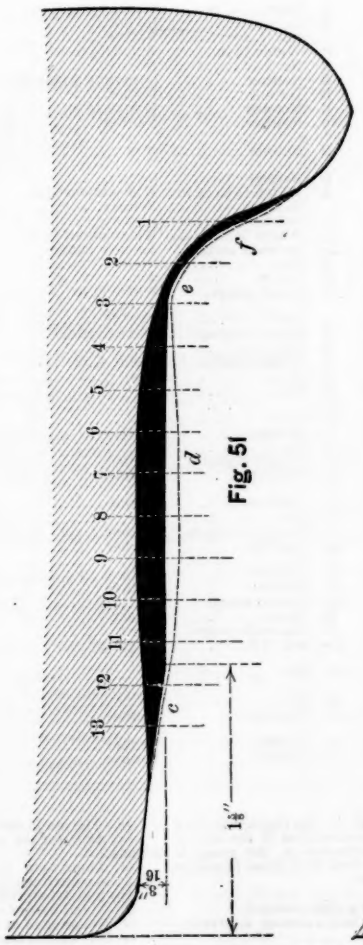


Fig. 51

Fig. 53

DISTANCE BETWEEN FLANGES OF CAR WHEELS.

Name.	Greatest distance.		Least distance.		Variation from M. C. B. standard.		Total difference.
					+	−	
	Ft.	In.	Ft.	In.	In.	In.	In.
Robert Miller...	4	5¾	4	5⅛	⅜	¼	⅝
Chas. Blackwell	4	5⅞	4	4⅞	⅛	⅛	1
L. Garey.....	4	5⅛	4	4¾	⅛	⅜	¾
Wm. Forsyth...	4	5⅞	4	5⅛	⅛	¼	⅜
Jno. S. Lentz...	4	6	4	5¼	½	⅛	⅝
P. Reilly	4	5⅝	4	5⅜	¼	0	¼
Peter Smith....	4	5⅞	4	5	⅛	⅜	⅜
John Kirby....	4	5⅞	4	5	⅛	⅜	⅜
W. F. Turreff..	4	5⅛	4	5	⅛	⅜	½
R. C. Blackall..	4	5⅞	4	5¼	⅛	⅛	⅜
J. W. Fleming	4	5¾	4	5⅛	⅜	¼	⅝
....	4	5⅜	4	5	0	⅜	⅜
R. H. Soule. ...	4	5¾	4	4¾	⅜	⅝	1

We have here a maximum distance of 4 ft. 6 in., and a minimum of 4 ft. 4¾ in. If now we refer to the table of the dimensions of permanent way it will be seen that on many roads it is the practice to make the flange-way between the guard-rails and main-rails and between the wing-rails and frog-points 1¾ in., so that the distance *over* the guard-rails and wing-rails is 4 ft. 5 in., or ¼ in. more than the minimum distance between the flanges of the wheels. There are cases, too, of the flange-way being only 1⅝ in. The distance over the guard rails and wing-rails is ⅛ in. *more* than that between the flanges of the wheels. That it should be difficult with wheels gauged in that way to keep guard rails in position, and that axles should be bent and wheels broken is not surprising.

There has not been time to analyze the table of track dimensions very carefully. It must be said, however, that the distance over the guard-rails in all the cases which have been examined in the table is less than the standard distance between flanges of wheels adopted by this Association. With 1⅝-in. flange-way, however, the distance over the guard-rails will be 4 ft. 5¼ in., and with 1¾-in. flange-way it will be 4 ft. 5 in. It is a question for the consideration of this Association whether ⅛ or even ⅜ in. is enough end play or clearance between the wheels and guard-rails.

The variation in the distance between the flanges of wheels also suggests that there should be some positive limit to this variation. With cast-iron wheels and rough flanges exactness of gauge is impossible. If the distance between flanges is fixed at 4 ft. 5⅜ in., it must be left to the judgment of the workmen how much variation therefrom is admissible. Experience shows that if the discretion of workmen in such matters is relied on, that great variations from the standard are almost certain to result. The Pennsylvania Railroad officers have wisely fixed the limit, or least distance between flanges of wheels which will be received on its line at 4 ft. 5¼ in. It seems as though the standard-gauge roads might properly adopt a maximum limit. It is therefore thought that it would be a wise measure if this Association should adopt a maximum and minimum standard distance between flanges of wheels. If, instead of fixing this standard at 4 ft. 5⅜ in., it was stipulated that it shall not be more than 4 ft. 5½ in., nor less than 4 ft. 5¼ in., the differences and errors would be confined within those limits. As the standard is now expressed the distance is made full or scant, which may mean $\frac{3}{32}$, $\frac{5}{32}$, or ¾ in. more or less than it ought to be.

The suggestion of this paper may then be summed up as follows:

1. That the standard form proposed in this paper for the treads and flanges of wheels should be adopted experimentally by this Association, that is, that the members should agree to put a sufficient number of wheels with treads and flanges of that shape in service, so as to be able to report thereon at the next annual meeting, with a view to the final adoption of the form as a standard.

2. That the distance between the backs of flanges should be limited to maximum and minimum dimensions as proposed.

3. That the officers of the permanent way departments should agree on some standard form for the corners and tops of rails, preferably ⅛-in. radius for the corners and 6-in. radius for the tops.

4. That they should agree on some point on the rail from which the gauge should be measured.

5. That they should establish a standard gauge for the distance over all guard and wing rails.

These suggestions are submitted with a view of putting them into some definite form for discussion, and with the assurance that all that is needed to remedy the evils pointed out is that they should receive due consideration from those for whom this paper has been written.

Table Giving the Answers to Questions which were contained in a Circular of Inquiry sent to Various Railroad Officers to Ascertain their Practice in Laying Track, Locating Frogs, Guard-Rails, Etc.

(With Paper on Relations of Railroad Wheels and Rails to Each Other, by M. N. Forney.)

The *italic* letters in the table refer to foot notes below.

Name of Road.	1 What is the gauge of the track of your road?	2 Do you measure the gauge at the point *A* or *B* on the rail,* shown in Fig. 1?	3 How much space do you give on tangents for flange-way between the guard-rail and main-rail, as indicated at *N*, Figs. 3 and 4?	4 How much space do you give for flange-way at *M*, between the frog-point and wing-rail?	5 How much at *T*, in the throat of the frog?	6 Do you measure the flange-way between the points *A* or *B*, Fig. 1, on the rails?	7 Do you either widen or narrow the gauge on a tangent at *G*, Fig. 3, opposite to the points of frogs? If so, how much?	8 Do you either widen or narrow the gauge of turn-outs at *E*, opposite to the points of frogs? If so, how much?	9 How much space do you give on turn-outs for flange-way at *K*, between the turn-out rail and guard-rail?	10 How much at *L*, between the frog-point and wing-rail?	11 Do you make any change in the gauge of track opposite to frogs when they are laid on either the inside or the outside rails of curves on main line?	12 How much space do you give at *N* for flange-way between the guard-rail and main-rail when frogs are laid on curve?
	Ft. in.		In.	In.	In.				In.	In.		In.
1. South Pacific Coast	3 0	B	2⅜	2	2¼	A	Do not.	Do not	2	2	We do	2¼
2. St. Joseph & Des Moines	3 0	A	2	1¾	2	A	Narrow	No	2¼	1¾	Yes, on outside to gauge; inside, ¼ in. tight.	2¼
3. Kansas City, St. Joseph & Council Bluffs	4 8½	A	2	1¾	2	A	Narrow ⅛ in	No	2¼	1¾	Yes, on outside to gauge; inside, ¼ in. tight	2¼
4. San Francisco & North Pacific	4 8½	B	1¾	1¾	1¾	B	No	No	1¾	1¾	Frog inside keep to gauge snug; outside, no	1¾
5. Chicago & Western Indiana	4 8½	B	2	1¾	2	B	Lay to gauge	Lay to gauge	2	2	No	2
6. Worcester, Nashua & Rochester	4 8½	B	2	2	2	B	No	No	2	2	No	2
7. Peoria & Pekin Union	4 8½	B	2	2	2	A	Do not	Do not	2	2	Do not	2
8. Green Bay, Winona & St. Paul	4 8½	B	2¼	2	..	B	The same	The same	2¼	1¾	No	..
9. Cleveland, Lorain & Wheeling	4 8½	(*f*)	2	2	2	(*f*)	Neither	Neither	2	2	We do, from ¼ in. to ¾ in	2 (*e*)
10. Wisconsin Central	4 8½	B	1⅝	1⅝	1⅝	B	Neither	(*p p*)	1⅝	1⅝	No	1⅝
11. New York, Pennsylvania & Ohio	4 8½	B	2	2	2	(*f*)	No	No	2	2	No	2
12. New York, West Shore & Buffalo	4 8½	B	2	2	2¼	B	Neither	(*q q*)	2	2	About ⅛ in. wide for each 2° in main line	2 (*g*)
13. Norfolk Southern	4 8½	B	1¾	1¾	2¼	B	Do not	Widen from ¼ to ¾ in.	2½	1¾		..
14. Carolina Central	4 8½	B	1¾	2	2	B	None	Widen ¼ in	2	1¾	Yes, ¼ in. wider	2
15.	4 8½	B	2¼	2	2	B	Lay to guage	Neither	2½	2	No change	2¼
16. Peoria, Decatur & Evansville	4 8½	B	2	(*i i*)	2	B	Neither	Widen about ⅛ in	2	(*i i*)	No	2
17. Southeastern Railway of Canada	4 8½	B	1¾	1¾	1⅞	B	4 ft. 8¼ in	4 ft. 8¼ in	1¾	1¾	Yes, if frog is on inside of curve gauge 4 ft. 8¼ in.	1¾
18. Chicago & Grand Trunk	4 8½	B	1¾	1⅞	1⅞	A	No	No; make it easy gauge	1¾	1¾	No	1¾
19. Utica & Black River	4 8½	(*l*)	(*m*)	1⅝	1⅝	(*n*)	Neither	Neither	1⅝	1⅝	None	1⅝
20. Morgan's Louisiana & Texas	4 8½	B	A	2	2¾	A	Do not	Do not	2	2	Do not	2
21. Philadelphia & Reading	4 8½	A	A	A	2½	A	Neither	Neither	2	..	No	2½ and 2
22. Minneapolis & St. Louis	4 8½	A	A	1⅞	2	B	Widen ⅛ in	Widen ¼ in	1¾		On outside rail	1¾
23. New York, Chicago & St. Louis	4 8½	B	B	2	2	B	Neither	Widen about 3/16 in.	2¼ to 2½	1¾	If curve is over 3° we widen from ¼ in. to ½ in.	(*q*)
24. Atlantic & Pacific	4 8½	B	A	2⅛	1⅞	B	Neither	Neither	2½	1⅞	No	2⅛
25. Central Vermont	4 8½	A	A	1¾	2¼	A	Spike to gauge	Spike to gauge	2	1¾	No	2
26. Cheshire	4 8½	(*f*)	1¾	1¾	1¾	(*f*)	Neither	Neither	1¾	1¾	None	1¾
27. Naugatuck	4 8½	B	B	2	2½	(*v*)	Do not	Yes; 1-16 in. per deg.	(*s s*)	2	No, except as stated	2
28. Northern Pacific	4 8½	B	B	2	2½	B	No	No	2	2	No	2
29. Pontiac, Oxford & Port Austin	4 8½	B	B	2	2	B	No	¼ in	2¼	2	No	2½
30. New York Central & Hudson River	4 8½	B	A	1¾	1¾	A	No	No	1¾	1¾	No	1¾
31. Chicago & Alton	4 8½	B	B	1¾	2	No.	½ in	Widen 2 in	1¾	1¾	½ in	2
32. Northern & Northwestern of Canada	4 8½	(*f*)	1⅝	1⅝	1⅝	(*f*)	Narrow ¼ in	Narrow ¼ in	1⅝	1⅝	(*s*)	1⅝ to 2
33. Old Colony	4 8½	A	1¾	1¾	2	A	Neither	No variation in gauge.	1¾	1¾	No	1¾
34. Boston, Barre & Gardner	4 8½	B	1½	1¾	3⅛	B	Narrow ¼ in	Widen ⅛ in	1¾	1¾	No change	1⅛
35. Louisville, New Albany & Chicago	4 8½	B	2	2	2	B	Do not	Do not	2	2	Spread gauge ⅛ in. per degree up to ½ in.	2
36. Marquette, Houghton & Ontonaga	4 8½	(*f*)	2	2	2	(*f*)	No	No	2	2	No	2
37. Milwaukee, Lake Shore & Western	4 8½	B	2	2	2	B	Widen ½ in	Widen ½ in	2	2	Widen the gauge	2½
38. Boston & Albany	4 8½	B	1¾	1¾	1¾	B	No	No	1¾	1¾	No	1¾
39. Hannibal & St. Joseph	4 8½	B	2	(*jj*)	(*jj*)	B	Neither	Generally widen ¼ in.	2	(*jj*)	No change	2
40. New York City & Northern	4 8½	B	2	2	..	B	Do not	Do not	2	2	⅛ in. tight when inside	2
41. New York, Pittsburgh & Chicago	4 8½	B	1⅞	2	2⅝	B	Not any	¼ in to ½ in	2	2	Sometimes, according to degree of curvature	(*t*)
42. Cumberland & Pennsylvania	4 8½	B	2	2	2	No.	Neither	Neither	2	2	Not any	2
43. Boston & Lowell	4 8½	B	1¾	1¾	2	B	Neither	(*r r*)	1¾	1¾	No	1¾
44. Central Pacific and leased lines	4 8½	B	2	2	2	B	Neither	(*u*)	(*s s*)	2	(*u*)	(*v*)
45. Illinois Central	4 8½	B	2	1⅞	1⅞	A	Widen ⅛ to ¼ in.	Widen about ¼ in.	1¾ to 2	(*k k*)	Not any	1⅞ to 1¾
46. Detroit, Grand Haven & Milwaukee	4 8½	B	2½	1¾	1¾	..	Neither	Neither	3	1¾	No	1¾
47. Manhattan Elevated	4 8½	B	2	2	2½	B	Neither		2	2	No	2
48. Chicago, Burlington & Quincy	4 8½	B	1¾	1¾	1¾	B	Widen ⅛ in	Widen about ⅛ in	1¾	1¾	Widen about ⅛ in	1¾
49. Cleveland, Columbus, Cincinnati & Ind.	4 8½	A	2	2	2⅝	(*w*)	An easy gauge	An easy gauge	2	2	No	2¼
50. Ohio Central	4 8½	B	1¾	1¾	2	B	No	No	1¾	1¾	No	1¾
51. Bangor & Piscataquis	4 8½	B	1¾	1¾	2	B	No	No	1¾	1¾	No	1¾
52. Canadian Pacific	4 8½	A	1¾	1⅞	1¾	A	Exact gauge	Widen ⅛ in	1¾	1⅞	Narrow ¼ in. for former, widen ¼ in. for latter	(*x*)
53. Boston, Hoosac Tunnel & Western	4 8½	B	1⅞	1¾	2	A	No	Yes; ⅛ in	(*t t*)	1¾	(*e e e*)	(*y*)
54. Hartford & Connecticut Valley	4 8½	B	1¾	1¾	1¾	B	Spike to gauge	Spike to gauge	1¾	1¾	Same as on main track (16)	(*z*)
55. Delaware & Hudson Canal Co	4 8½	B	2½	1¾	1¾	B	No	No	2½	1¾	No	2½
56. Pennsylvania & N. Y. Canal & Rail'd	4 8½	B	1¾	1¾	2	B	Widen ⅛ in	Widen ⅛ in	1¾	1¾		1¾
57. Fitchburg	4 8½	B	2	2	..	B	(*n n*)	(*n n*)	2	2	With Mansfield frogs ½ in	2
58. Detroit, Lansing & Northern	4 8½	B	2	1¾	(*k k*)	B	No	No	2	1¾	No	2
59. Chicago, Rock Island & Pacific	4 8½	A	2	1¾	2¼	(*w*)				1¾		..
60. Raleigh & Gaston and Raleigh & Aug'ta	4 8½	..	2	1¾	1¾	No.	(*o o*)	(*o o*)	2½	1¾	None	2½
61. Cincinnati, Wabash & Michigan	4 8½	B	2¼	2½	2½	B	Neither	Neither	2¼	2½	No	2¼
62. Michigan Central	4 8½	A	2	1¾	1¾	A	No	No	2	1¾	No	2
63. Houston & Texas Central	4 8½	A	2⅜	1¾	1¾	B	Widen slightly	Neither	2⅜	1¾	None	2⅜
64. Lehigh Valley	4 8½	A	1⅞	1⅞	1⅞	A	Neither	Neither	1⅞	1⅞	No	1⅞
65. Scioto Valley	4 8⅝	(*bb*)	1¾	1¾	2	B	Neither	Neither	1¾	1¾	Do not	1¾
66. New York & New England	4 8¾	B	1¾	(*cc*)	2	B	No	No	1¾	1¾	Not generally, gauge may be made ¼ in. wide	(*cc*)
67. Petersburg	4 9	B	2¼	(*dd*)	2½	..	From ¼ to ½ in.	Neither	2¼	2	Do not	2
68. Pennsylvania Railroad	4 9	B	2	2	2	A	Neither	Neither	2	2	No change	2
69. Pittsburgh, Cincinnati & St. Louis	4 9	A	2	1⅞	2⅛	A	No	No	2	1⅞	No	2
70. Columbus, Hocking Valley & Toledo	4 9	B	2⅜	2	2	B	Neither	Neither	2⅜	2	No	2⅜
71. Jeffersonville, Madison & Indianapolis	4 9	B	2	2	(*ee*)	A	Neither	Neither	2	2	No	2
72. New York, Susquehanna & Western	4 9	A	2	2	2½	A	Lay to gauge		2	2	No change	(*ff*)
73. Cumberland Valley	4 9	B	2¼	2¼	(*ll*)	B	Do not	Do not	2¼	2¼	Do not	2½
74. Cleveland, Mt. Vernon & Delaware	4 9	B	1⅞	1⅞	2½	B	Maintain gauge	(*gg*)	(*h h*)	1⅞	None	1⅞
75. Ohio & Mississippi	4 9	..	2	2	2	Yes.	4 ft. 9 in	To gauge	2	2	(*v v*)	2
76. Pennsylvania Company	4 9	B	2	2	2	B	No	No	2	2	No	2
77. Indianapolis & Vincennes	4 9	B	2	1⅞	2½	B	No	No	2	1⅞		2
78. Savannah, Florida & Western	5 0	(*f*)	1¾	1¾	2	(*f*)	Neither	Neither	1¾	1¾	Make no change in gauge	1¾
79. Cincinnati, New Orleans & Texas Pacific	5 0	B	2	1¾	2¼	B	Neither	Neither	2¼	1¾	Make the gauge on the curve ¼ in	2
80.	5 0	(*f*)	1¾	1¾	(*m m*)	(*f*)	Neither	Neither	1¾	1¾	No	1¾

* If the sides of the heads of the rails are vertical, and not inclined, as in the engraving, it of course makes no difference from what point on the side the gauge is measured, but if the side of the head is inclined, as in the engraving, there will be a very material difference in the gauge if measured at *A* from what it would be if measured at *B*. The figures referred to in these headings will be found on pages 276 and 277, present volume of the *Railroad Gazette*.

(*a*) Do not use "split" switches.
(*b*) We kink the main rail at the point of switch sufficiently to keep the points shielded.
(*c*) Up to our maximum curve of 7° in these portions of our line when fast running is practicable we lay to gauge.
(*d*) On portions of line when high speeds are attained, ⅛ in. to each degree, our maximum curve being 7°.
(*e*) The same opposite point of frog, but guard rails at ends are bent to clear 3 in. from the main rail.
(*f*) The sides of the heads of rails are vertical.
(*g*) 2 in. up to curves of 2°, then add about 1-16 in. to 1°.
(*k*) Immediately in front of point of switch the gauge is made 4 ft. 9 in.
(*l*) At *B*, or at any point of rail that curves to the right angle gauge.
(*m*) 1¾ made up from what the clear space between wheels requires.
(*n*) At *B*, for the reason the inside of some flanges require it to give clear space between the wheels.
(*o*) About ⅛ in. to a degree, but for swift speed it should be more; keep the forces of centripital and centrifugal even. We elevate for single track for all grade of trains.
(*p*) 2 in. when frog is on outside of curve, and 1¾ when on inside.
(*q*) About half of extra gauge.
(*r*) Not gauged at this point.
(*s*) No; except the change mentioned in answer to questions 7 and 8, but no difference is made between the sides of the curve.
(*t*) 1¾ in. outside, 2 in. inside.
(*u*) Widen ⅛ in. for 2°, ¼ in. for 3° and 4°, ⅜ in. for 5° and 6°, ½ in. for 7°, 8°, 9° and 10°.
(*v*) 2 in. + extra width of gauge.
(*w*) At point half-way between *A* and *B*.
(*x*) 2 in. when frog is on outside of curve, and 1¾ in. when on inside.
(*y*) Always gauge guard rail 4 ft. 6⅝ in. from frog on further rail.
(*z*) Allow the extra width of gauge, if any.

Table Giving the Answers to Questions which were Contained in a Circular of Inquiry Sent to Various Railroad Offices to Ascertain their Practice in Laying Track, Locating Frogs, Guard-Rails, Etc.

(With paper on Relation of Railroad Wheels and Rails to Each Other, by M. N. Forney.)

The *italic* letters in the table refer to foot notes below.

Number of road as on previous page.	13. How wide do you make the gauge of switches at *H*, Fig. 5?	14. How wide do you make the gauge of main-track at *K*, Fig. 5, in front of switches?	15. How much throw do you give to split switch-rails, as indicated at *X*, Fig 5?	16. What is your rule for widening the gauge on curves of main line?	17. What is your rule for elevating the outer rails on curves above the inner rails?
			In.		
1	3 ft	3 ft		To 10° we make ¼ in. wider up to 16°; to 18° we make ⅛ in. wider	¼ in. to the degree up to 3 in.; we do not elevate any higher than 3 in.
2	(*a*)	(*a*)	(*a*)	⅛ in. to ½ in.	⅜ in. per degree.
3	Proper gauge	Proper gauge	(*zz*)	⅛ in to ½ in., according to degree of curve	⅛ in. per degree on main line; around depots in yards, *level*.
4	(*a*)	(*a*)	(*a*)	Widen ¼ in	7° curve 1½ in., others proportionate.
5	4 ft. 8½ in.	4 ft. 8½ in. (*k*)	5	(*c*)	(*d*)
6	4 ft. 8½ in.	4 ft. 8½ in.	(*a*)	Set at gauge	1 in. to a degree.
7	(*a*)	(*a*)	(*a*)	¼ in.; no curves over 6°	⅛ in. per degree of curve.
8	(*a*)	(*a*)	(*a*)	Make them 1-16 in. loose	⅜ in. for every degree of curve.
9	4 ft. 8½ in.	4 ft 8½ in	5	Widen from ¼ in. to ¾ in. according to the degree of curve	⅛ in. to each degree.
10	⅜ in spread	4 ft. 8½ in.	5	Widen ⅛ in. up to 3°, ¼ in. from 3° to 5°, above 5° and up to 8° widen ⅜ in	We raise the outer rail the length of the versed sine of a chord 48 ft. long.
11	4 ft. 8½ in.	4 ft. 8½ in	3½	Do not have any rule; think it not right to widen gauge on curves	⅛ in. to each degree of curvature.
12	4 ft. 8½ in. (*k*)	4 ft. 8½ in.	3½	About ⅛ in. to each 2°	About ¾ in. to each degree.
13	4 ft. 8½ in.	4 ft. 8¼ in	3	Widen 1-32 in. to each degree	⅛ in. each degree for 35 miles per hour; elevation is in proportion to speed.
14	(*a*)	(*a*)	(*a*)		
15	4 ft. 8½ in.	4 ft. 8½ in.	(*a*)	On curves greater than 3°, 4 ft. 9 in.; greater than 5°, 4 ft. 9¼ in	We use the middle ordinate of a chord of 54 ft. in length.
16	(*a*)	(*a*)	(*a*)	Lay flat curves loose gauge, and widen ¼ in. on 3° to ½ in. on 6°	⅛ in. per degree or versed sine or chord of 43 ft.
17	(*a*)	(*a*)	(*a*)	Do not do it: spike curves same as tangents	This depends wholly on the speed of trains; cannot give a general rule.
18	4 ft. 8½ in.	4 ft. 8½ in.	5	No; only make it easy gauge	
19	(*a*)	(*a*)	(*a*)	Have no curves over 4°; make no difference	(*o*)
20	4 ft. 8½ in.	4 ft. 8½ in.	3½ to 5		¾ in. per degree.
21	4 ft. 8½ in.	4 ft. 8¼ in.	3½	5° and less, 4 ft. 8½ in.; 5° and upwards, 4 ft. 9 in	⅛ in. to a degree up to 6°, ⅝ in. to a degree from 6° to 10°.
22	(*a*)	4 ft. 8 9-16 in.	(*a*)	From 6° to 10°, ½ in.; 10° and above, ¾ in	3° curve, 1½; 10° curve, 3¾ in.; intermediate degrees accordingly.
23	Loose gauge	Loose gauge	5 scant	¼ in. — ⅛ in. for 3° — 6°	⅛ in. per degree of curvature in ordinary cases.
24	(*a*)	4 ft. 8½ in.	(*a*) 5	1° and 2° ⅛ in.; 3°, 4° and 5°, ¼ in.; 6°, 7° and 8°, ⅜ in.: 9°, 10°, and 11°, ½ in.	⅛ in. per degree to 10°, above 10° elevate 5 in.
25	(*a*)	(*a*)	(*a*)	Spike to gauge; leave no sharp curves	Being a single line we adopt a medium for freight and passenger service.
26	(*a*)	(*a*)	(*a*)	⅛ in. to each degree; limited to ¾ in	¾ in. for each degree of curvature, limited to 3⅛.
27	4 ft. 8½ in.	4 ft. 8½ in.	4½	Where required, 1-16 in per degree	.05 ft. per degree of curvature.
28	(*a*)	(*a*)	(*a*)	1-16 in. per degree	⅛ in. to 1 degree.
29	4 ft. 9 in.	4 ft. 8½ in.	5	⅛ in. to the degree	.05 to the degree.
30				Do not.	
31	⅛ in. wide	¼ in	5	Gauge not widened on curves less than 4°	⅜ in. to each degree.
32	4 ft. 8½ in.	4 ft. 8½ in.	(*a*)	From 1° to 3°, 4 ft. 8½ in.; from 3° to 4° + ¼ in.; from 4° to 5°, + ½ in	Outer rail elevated ½ in. per degree on main lines.
33	(*a*)	(*a*)	(*a*)	On sharp curves 1-16 in. per degree	Have no special rule; it depends on the location of curves, whether at station or not.
34	4 ft. 8½ in.	4 ft. 8½ in.	4½	⅛ in	That depends on the degree of curve.
35	(*a*)	(*a*)	(*a*)	⅛ in. per degree up to ½ in., and no more after that	(*ccc*)
36	4 ft. 8½ in.	4 ft. 8½ in.	2	1-10 in. per degree	⅛ in. per degree.
37	(*a*)	(*a*)	(*a*)	On any curve less than 1,450 radius widen from ¼ in. to ¾ in	See page 178 of "Road Master's Assistant."
38	(*a*)	4 ft. 8½ in.	4½	Have not discovered the need of any rule	(*ddd*)
39	(*a*)	(*a*)	(*a*)	Do not widen gauge for curves less than 3°	¾ in. to degree for 30 miles per hour.
40	4 ft. 9 in.	4 ft. 9 in.	4	6° curve, widen ⅛ in.; 8°, widen ¾ in.	Usually ¾ in. per degree.
41	4 ft. 8½ in.	4 ft. 8½ in.	5	¼ in. to ½ in., according to degree	¾ in. to degree until 7 in. is reached; depends mostly on the speed.
42	4 ft. 8½ in.	4 ft. 8½ in.	3½	Curves same as straight lines	Raise outer rail to right elevation by level.
43	(*w w*)	(*ww*)	4½	$W = \frac{160}{R} - .1 = 1\frac{1}{2}$ in. for 100 ft. radius	⅛ in. per degree up to 3 in. elevation.
44	(*u*)	(*u*)	3 to 3½	(*v*)	¾ in. per degree when that rate does not exceed maximum elevation of 5 in.
45	(*xx*)	(*xx*)	3½	Don't widen them	2½ to 3 in. on 10° curves, according to speed.
46	4 ft. 8½ in.	4 ft. 8½ in.	(*a*)	Not any	600 ft. curve, 3½ in.
47	4 ft. 8½ in.	4 ft. 8½ in.	4	Make them 4 ft. 9¼ in	4 in. on these of 90 ft. radius, the others 3¾ to 4 in.
48	4 ft. 8⅝ in.	4 ft. 8 9-16 in.	3½	On main line widen gauge about 1-16 in.	⅛ in. for each degree.
49	An easy gauge	Gauge	5	1°, gauge; 2°, ⅛ in. wide; 4°, ¼ in. wide; 6°, ⅜ in. wide; 8°, ½ in wide	For each degree of curve, ¾ in.
50	4 ft. 8½ in.	4 ft. 8½ in.	4¾	Have not fixed rule; do not widen unless curve exceeds 6°	.05 per degree.
51	(*a*)	(*a*)		Use Charles Latimer's rule	⅛ in. per degree.
52	(*a*)	(*a*)	(*a*)	Tight gauge on curves up to 6°, and 4 ft. 9 in. for curves from 6° to 8°	¾ in. per degree up to 4° curve for speed up to 50 miles passenger and 20 miles freight.
53	(*yy*)	4 ft. 8½ in.	4	3° and under, ¼ in.; 4°, 5° and 6°, ⅛ in.; 7° and over, ¾ in.	¾ in. per degree up to 5°; nothing above 5 in.
54	(*a*)	(*a*)	(*a*)	⅛ in. wide from 2° to 4°; ¼ in. from 4° to 8°; over 8°, ½ in	1 in. to a degree up to 5°, ¾ in. 5° to 6°, ⅝ in. 6° to 8°, ¼ in. 8° to 10°.
55	4 ft. 8½ in.	4 ft. 8½ in.	5	About ⅛ in	Average ¾ in. for each degree of curvature.
56	4 ft. 8½ in.	4 ft. 8½ in.	3½	⅛ in.	¾ in. to each degree.
57	(*a*)	4 ft. 8½ in.	(*a*)	Do not widen for 1° or 2° curves; 3° and 4° widen ¼ in	Different according to curvature; averages ¾ in. per degree.
58	(*a*)	(*a*)	(*a*)	Curves less than 5° to gauge; 5° to 8°, widen ¼ in.; over 8°, widen ⅛ in	⅛ in. to 1 in. per degree of curve, depending on location of curve.
59	4 ft. 8¾ in.	4 ft. 8½ in.	5 (*aa*)	For 3° curve ⅛ in.; add 1-16 in. for each additional degree of curvature	Middle ordinate of chord of 50 ft.
60	4 ft. 8½ in.	4 ft. 8½ in.	3	We have none; gauge same as main line	We allow ¼ in. to the degree.
61	(*a*)	(*a*)	(*a*)	Slack ¼ in. to ½ in	No rule, except depends on speed of train.
62	4 ft. 8½ in.	4 ft. 8½ in.	5	Do not widen	⅛ in. to 1 in. per degree, according to speed.
63	4 ft. 8½ in.	4 ft. 8½ in.	4	No widening on 3° arms or less	About ¾ in. per degree.
64	4 ft. 8½ in.	4 ft. 8½ in.	3½	Curves less than 5° to gauge; 5° to 10°, widen ¼ in.; above 10°, 1¼ in	1 in. per degree up to 3°; ⅞ in. from 3° to 6°; ¾ in. from 6° upward.
65	(*a*)	(*a*)	(*a*)	We don't widen on curves	⅛ in. per degree.
66	4 ft. 8¾ in.	4 ft. 8¾ in.	3½ to 4	Up to 6°, gauge; from 6° to 9°, from ¼ in. to ½ in	1 in. to each degree up to 5°.
67	4 ft. 9 in.	4 ft. 9 in.	4	From ¼ in. to ⅛ in	According to degrees; a 10° curve we elevate outer rail 4½ in.
68	4 ft. 9 in.	4 ft. 9 in.	3½	Gauge standard up to a 4° curve, then ¼ in. wide	1 in. to the degree up to and including a 4° curve; then ¾ in. to the degree.
69	4 ft. 9 in.	4 ft. 9 in.	4	None	Left to judgment of men in charge of track.
70	4 ft. 9 in.	4 ft. 9 in.	5	(*bbb*)	Use a string 55 ft. long; middle ordinate equal elevation.
71	4 ft. 9 in.	4 ft. 9 in.	4	None up to 6°; ¼ in. from 6° to 12°	1 in. per degree.
72	4 ft. 9 in.	4 ft. 9 in.	5	⅛ in. wide	1 in per degree.
73	4 ft. 9 in.	4 ft. 9 in.	3½	Spike up to gauge; curves are all light	¾ in. per degree for a speed of 50 miles per hour.
74	4 ft. 8¾ in.	4 ft. 9 in.	4	Do not widen, as our gauge is ⅛ in. wider than standard	¾ in. per degree, or middle ordinate for 54 ft. chord.
75		4 ft. 9 in.	5	On curves over 5° we widen the gauge about ¼ in	On 5° or 6° curves we elevate from 5 to 6 in.; this is for speeds of 45 to 50 miles per hour.
76	4 ft. 9 in.	4 ft. 9 in.	(*aaa*)	We do not widen in curves we have on main line	When we have running ground we make 1 in. per degree to 4°, then ¾ in. per degree.
77	4 ft. 9 in.	4 ft. 9 in.	4	⅛ in. for 1° to 2°; ¼ in. for 3°, 4°, 5° and 6°	1 in. for 1°, 2 in. for 2°, ½ in. for each succeeding degree.
78	(*a*)	(*a*)	(*a*)	We do not widen gauge	About ½ in. to a degree; begin to elevate 50 ft. from p. c. for every degree of curve.
79	5 ft	5 ft.	5	See book of instruction	See book of instruction.
80	(*a*)	(*a*)	(*a*)	Make gauge exactly 5 ft	½ in. for every degree.

(*aa*) To allow the same switch stand to be used on both stub and split switches.
(*bb*) About half way between *A* and *B*.
(*cc*) Generally 1¾ in.; on very sharp curves, 2 in.
(*dd*) Nearest point 2 in.

(*ee*) Depends on the number of the frog = $\sqrt{2^2 + \left(\frac{2}{\text{No. of frog}}\right)^2}$ in inches.

(*ff*) 2 in. at *N*, and have frog point ¼ in. cut back from line.
(*gg*) Widen ¼ in. for 10° curve or over, and brace well and watch it.
(*hh*) 2 in. and 2⅛; brace well for curves up to 10°.
(*ii*) 1¾ to 2 in.
(*jj*) 1¾ to 1⅞.
(*kk*) 1⅞ to 2.
(*ll*) 2 and 2⅛.
(*mm*) 1½ to 2.
(*nn*) With Mansfield frogs, ½ in.
(*oo*) On sharp curves give ¼ in. to ⅜ in. difference.
(*pp*) None, unless on very sharp turnouts.

(*qq*) Neither, but have 15 ft. straight opposite frog.
(*rr*) Neither, except on sharp curves.
(*ss*) 2 + extra width.
(*tt*) (1⅞ + 1½ in. = 2⅜ in.), *i. e.*, gauge 4 ft. 6⅜ in. from frog.
(*uu*) Spread track when frog is on outside, but keep to gauge when frog is on inside of curve.
(*vv*) When curve is sharp, say 6° or 8°, we widen on outside and snug gauge when on inside.
(*ww*) 4 ft. 8½ in. at point 4 ft. 9 in.
(*xx*) 4 ft. 8½ in. to 4 ft. 8¾ in.
(*yy*) Depends on planing of switch-rail.
(*zz*) 4 in. at point of switch-rail or tongue.
(*aaa*) Throw, 3⅞ in.; actual opening, 3½ in.
(*bbb*) When elevation is less than 3 in. = gauge; when over 3 in. and less than 5 in. spread gauge ¼ in.; over 5 in. spread gauge ½ in.; speed, 35 miles per hour.
(*ccc*) Elevate until each rail wears alike on flange side up to a height of 6 in., and make trains reduce speed after that heighth is attained if rail continues to wear on high side.
(*ddd*) Add to the velocity in miles per hour ½ of itself, and the middle ordinate of that distance in feet on any curve will be the required elevation.
(*eee*) Spread track when frog is on outside, but keep to gauge when frog is on inside of curve.

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE DEMAND FOR CONSTRUCTION MATERIALS.

The present unsatisfactory condition of the national industry we have ascribed largely to the over-development of certain means of production, chiefly visible in an extraordinary amount of new construction, an addition to the number of factories, machines, and especially of railroads, out of proportion to the ability of the country to consume the products of these industrial appliances. We do not mean to say by this that there is a general over-production, for that is virtually impossible; but industry may be and often is so applied that there may be a greater production, or a greater capacity for production, of some things than the community can consume. It is easy to understand that in a community of 20, on an island, one man might profitably devote all his time to getting fuel and timber, and two to fishing, and that when the community had increased to 25, if two men were employed solely in getting fuel and four in fishing, there would be more fuel, timber and fish than the community could use, with only 19 persons available for other work. Not but that it might not *desire* all that could be made out of the larger supply of timber—more building and furniture—but that it could not spare the force necessary to utilize it, and could not produce what would be necessary to exchange for it, namely, the other necessaries of life required to support the woodsmen.

It is with a nation of fifty-six millions as it is with a little community. We have wants enough to enable us to consume several times as many dollars' worth as we do actually consume, but we will not get what we want if offered two loaves of bread, two suits of clothes, etc., for every one we now consume. Therefore, when the community has the ability to increase its production, it has a complex problem before it, for its efforts will be largely thrown away if it simply increases at the same rate its production of everything. Those who consumed bread only, with increased wealth will take little or no more bread, but want butter and meat; and those who wore cotton call for some wool and even silk. This, however, may be said to settle itself in a large community. People increase the production of such things as are most in demand. Bread having been cheap, consumers have saved a little and call for meat, and so the price of meat becomes relatively higher than that of bread, which leads the farmer to sow less wheat and raise more hogs and cattle.

This is true enough of most things which we eat and wear, with all that perishes in the using—the materials of unproductive consumption. But we have no such sensitive barometer to register the pressure for materials which enter into lasting structures—houses, factories, machines and railroads—which are largely or chiefly intended to increase production, and not to satisfy current personal wants. Take our little community again. Having learned to provide food and raiment with less than its former effort, it sets free a certain amount of labor which may be devoted to making brick and brick houses for shelter, instead of the temporary huts which have served it heretofore. For years all the surplus labor may be so employed; but the houses once erected, there is need for the brick-making, house-erecting industry only so far as required to make repairs and provide for the increase of the community.

In the larger community something of the same sort occurs. Having lived closely for years, and having a surplus available for producing more and therefore for consuming more, there is a sudden demand for the materials used in producing the things for which the demand has increased. People want more cloth, more tools, more agricultural machinery, and there is increase in traffic, which results in a demand for the materials which go into new factories and railroads—for building materials of every kind; thus, parallel with the growth of the establishments which minister chiefly to unproductive consumption we have a great expansion in those industries which produce the materials of construction, iron, lumber, brick, stone, etc. These materials, it is true, minister to unproductive consumption to a considerable extent, but when they do they are very slowly consumed, so much so that a very small increase in yearly production provides in a few years for an enormous increase in the buildings and appliances into which they enter.

Now, during the time that a country is increasing its productive establishments, the demand for construction materials increases enormously, and a very important part of the industrial force of the community is diverted not only to the increase of the production of these materials, but to increasing the establishments which produce them, and they afford a very important part of the traffic of many carriers.

But it is impossible that there should be permanently a very rapid growth in the consumption of these materials—that is, a growth much more rapid than that of the community supplied. An increase of 10 per cent. yearly in the supply per individual would mean that the structures, machinery, etc., would be doubled perhaps as often as every 12 years—that in the course of 24 years there should be four times as many, in 36 years eight times as many, and in 48 years 16 times as many structures and machines per individual as there are now, which would be absurd.

In fact, before all the projected new factories, etc., have been completed, after a revival of business activity, the demand for their production has usually already fallen off; and there being already an oversupply of factories and railroads, and such a mal-distribution of industrial forces as to reduce the ability of many to consume (for engaged in making brick when few want brick, they cannot pay for what meat and clothing they want), the demand for construction materials falls off greatly. A large proportion of these being always required for the maintenance of existing structures, this may not be manifest in a decreased production, but only in an arrest of the growth of production, which has nearly the same effect, as the productive capacity is likely to be far in advance of the demand when the consumption ceases to grow, so that works are insufficiently employed, as much so as if there had been a decline in consumption and they had not been increased.

The most rapidly growing part of the country of late years has been that west of Lake Michigan and St. Louis, and probably the best single key to its growth is its consumption of pine lumber, of which we have pretty complete statistics from year to year, and a tolerable measure from month to month in the sales at Chicago.

The sales of lumber at Chicago during the first five month of the year are shown as follows, in thousands of feet

	1884.	1883.
Stock Jan. 1	635,348	655.013
Receipts, 5 mos.	365,364	253,555
Total	1,000,712	908,568
Stock June 1	378,331	327,940
Sales	622,381	580,628

This indicates that 7 per cent. more lumber was marketed at Chicago this year than last year, when the consumption for this period was somewhat reduced by a long and severe winter; but when the consumption for the whole year was as large as ever before, and much larger than in any year before 1882.

One of the first and strongest signs of rapid growth and prosperity in the West is an increase in the demand for lumber; but the contrary has not generally been true—that is, when business has been dull and growth slow the lumber traffic has not always fallen off, but has simply ceased to grow. An exception is after 1857. From 1854 to 1856 and 1857 the receipts of lumber at Chicago doubled, and then fell off in a single year 40 per cent., and did not show a rapid growth again until after 1862, nor reach the figures of 1857 until 1864. The growth was rapid then till 1868; but from that time the receipts changed little until after 1878, when they increased 24½ per cent. in one year, and 80 per cent. in the four years ending with 1882.

This, it is true, is not a complete account of the course of the lumber traffic, for meanwhile there was the business of other lumber-distributing points, as Milwaukee, of the towns on the Mississippi where rafted logs are sawed, and the development of the now great lumber industry in northwest Wisconsin. Our statistics of these markets do not go back far enough to enable us to see what was the course of their lumber traffic until after 1870; but the total production was somewhat larger in 1873 than in any following year until 1879, though there was not a great change in this period, the smallest production, in 1877, being 10 per cent. less than the production of 1873. For eleven years the production has been in *millions* of feet:

Year.	Millions of ft.	Year.	Millions of ft.
1873	3,993.8	1879	4,806.9
1874	3,751.3	1880	5,651.3
1875	3,968.6	1881	6,768.9
1876	3,879.0	1882	7,552.2
1877	3,595.3	1883	7,624.8
1878	3,629.5		

Thus the statistics of total production as well as those of the Chicago receipts show the business to have been almost stationary from 1873 to 1878, then an enormous increase from 1878 to 1882, which was 108 per cent. in the total and 80 per cent. in the Chicago business, and a stationary condition since 1882, there having been in 1883 an increase of less than 1 per cent. in the total production and a decrease of 10 per cent. in the Chicago receipts.

Thus the fact that Chicago sales this year have been larger than last year and nearly as large as in 1882, and that the total traffic may have been fully as great as ever before and is truly enormous, does not prove that business in the Northwest is in a satisfactory condition. Business there is never in a satisfactory condition except when it is growing rapidly, rapid growth having been assumed as the normal condition of that part of the country, and its business enterprises and railroads having been planned for such a condition. Evidently the railroads will not be satisfied with a traffic like that of 1882, when they have now a mileage 15 or 20 per cent. larger, and we must bear this in mind in considering all statistics of this part of the country. Those who reason that as 1880 was a year of great prosperity, and traffic now is vastly greater than in 1880, therefore 1884 should be a very prosperous year, make a capital mistake. Where an immense capital has been invested solely to supply wants caused by growth, and growth ceases or falls off, many investors must suffer.

Lumber, like iron, is a chief material consumed when there is an expansion of industries. Great as has been the increase of farming population of districts like Dakota, it has been but trifling compared with the growth of towns in the older Western states, where trade and manufacturing have made more rapid progress than farming. The building of new houses, shops and factories in the towns, and the great extension of railroads, have had more to do directly with increasing the demand for lumber than the extension of farming in old or new states.

Now, it is with lumber as with iron, only more so, that the consumption for maintenance exceeds the consumption for new construction; so we see that the production of lumber after 1873 did not fall off, or fell off comparatively little, although new construction of almost all kinds fell off immensely. For five years of unparalleled stagnation (unparalleled in the West), the average lumber production was 3,799 millions of feet, against 3,994 in 1873. Compare this with the pig-iron production, which, after increasing 50 per cent. from 1871 to 1872, was for five years (in tons of 2,240 lbs.):

1872.	1873.	1874.	1875.	1876.
2,548,712	2,560,962	2,401,202	2,023,733	1,868,961

Thus the iron production fell off 27 per cent. from 1873 to 1876, in which time the Northwestern lumber production fell off but 3 per cent., though a considerable part of the decrease in iron consumption fell on foreign producers, and very little, if any, of the decrease in Western lumber production. Our iron imports in 1876 were 67 per cent. less than in 1873, and 82 per cent. less than in 1872, and if we add the iron imports to the pig-iron production, we have as the yearly iron supply in three years:

1872.	1873.	1874.	1875.	1876.
3,731,778	3,201,820	2,762,900	2,263,445	2,073,172

Thus we see that the supply of iron fell off no less

than 501,000 tons, or 15¾ per cent., from 1873 to 1874, and 35 per cent. from 1873 to 1876.

It began to increase in 1877, two years before lumber production began to increase, but in 1878 was but 2,512,308 tons, or less than in 1873, as was the case with the lumber production in 1878. Since then the course has been (production and imports):

1878.	1879.	1880.	1881.	1882.	1883.
2,521,224	3,511,837	5,721,210	5,325,003	5,506,690	5,289,840

The increase after 1878 was greater and more rapid in iron than in lumber, being no less than 40 per cent. from 1878 to 1879 (against 33 per cent. in lumber), 127 per cent. from 1878 to 1880 (against 55¼ per cent. in lumber), and 130 per cent. from 1878 to 1882 (against 108 per cent. in lumber). From 1878 to 1883 the percentage of increase was nearly the same in both these great materials of construction—110 per cent. in lumber and 111 in iron.

The consumption of iron, allowing for the fact that a very large part of the imports and nearly the whole of the production was of material that had to pass through one or more additional manufactures before being ready for use, probably reached its maximum in 1881 or 1882. The largest railroad construction was in 1882. This preceded by a little the maximum lumber production, but, generally, the courses of these two materials have been parallel. There has not been as yet so great a decrease in the supply of iron, however, as after 1872, the year of maximum railroad construction of its period, but there was a smaller consumption in 1883 than in 1882, and there is doubtless a smaller consumption now than in 1883. The lumber production in 1883 came to a halt, much as it stood after 1873. So the course of both these materials is similar, but not so marked as at the previous time when there was a sudden arrest of a rapid growth. The smaller reduction of the iron supply, however, indicates a less violent arrest of growth.

THE LAKE SHORE AND THE MICHIGAN CENTRAL.

Although a considerable number of railroads report earnings monthly in the northern middle states—the rich and now populous country north of the Ohio, west of Pennsylvania, and east of Chicago and St. Louis, scarcely any of the important trunk-line connections do so report, and none of the roads with a very heavy traffic. Here are the lines which carry the through traffic interchanged between the trunk lines and the West, the Northwest and the Southwest, a traffic carried at the same rate per ton per mile as that of the trunk lines themselves; but we get no monthly reports from the roads which have a very large share of this business. How far the roads that do not report monthly are from representing the condition of traffic in the district may be judged from the fact that the 16 of them together, with 5,970 miles of road, earned $29,400,000 last year, while the Pennsylvania system alone, which does not report monthly, earned $37,000,000, the Lake Shore $18,500,000, and the Michigan Central $14,000,000. Some slight clue to the condition of traffic on the trunk-line connections is got from the statement in the Pennsylvauia Railroad monthly reports of the amount that the net earnings of its western system have exceeded or fallen short of the liabilities for interest, rentals, etc., but we have really but little knowledge of the condition of traffic in this important district, which contains some 23,000 miles of railroad, until we get the yearly reports of the several companies. But for several years past the Lake Shore and the Michigan Central have made a statement for the first half of the year in the last week of June, and as these roads are among the leading carriers of trunk-line traffic, a few years ago taking more than one half of the through shipments from Chicago, these reports have given a great deal of much needed light concerning the course of traffic over the trunk-line connections generally.

The statements for the first half of this year were made last Wednesday. The Lake Shore makes this sorry showing:

	1884.	1883.	Inc. or Dec.	P.c.
Gross earnings	$7,330,900	$9,219,171	— $1,888,271	20.5
Expenses	4,515,400	5,722,966	— 1,207,566	21.1
Net earnings	$2,815,500	$3,496,205	— $680,705	19.5
Int., rents, etc.	1,800,000	1,749,403	+ 50,597	2.9
Surplus	$1,015,500	$1,746,802	— $731,302	41.9
Profit per share	$2.03	$3.53	— $1.50	41.9

The gross earnings thus fell off one-fifth compared with last year, and in spite of an enormous decrease in expenses the net earnings were reduced in nearly the same proportion, and as the charges for interest, rents, etc., were slightly increased, we have the enormous decrease of 42 per cent. in the profits available for dividend, bring down the profit per share for the half-year from $3.53 to $2.03.

This statement is made at the time dividends are declared, if there is anything to divide; and as the company paid $2 per share at the end of the first quarter of this year, this is a complete demonstration that there should be no dividend for the second quarter. But having shown that it has made only 3 cents to divide for this second quarter, the company with this same statement announces a dividend of $1.50 per share, which it hopes to earn in the second half of this year.

For eight successive years the results of the working of this railroad in the first half of the year have been:

Lake Shore & Michigan Southern—Earnings and Expenses January to June, for Eight Years.

Year.	Gross earnings.	Expenses.	Net earnings.	Surplus over fixed charges.	Profit per share.
1877	$6,461,166	$4,628,119	$1,833,047	$445,247	$0.90
1878	6,596,092	4,169,574	2,426,518	1,067,518	2.16
1879	6,938,482	4,217,921	2,720,561	1,370,561	2.77
1880	9,072,993	5,019,384	4,053,609	2,673,616	5.41
1881	8,954,926	5,285,164	3,669,762	2,307,762	4.66
1882	7,952,791	5,359,676	2,593,045	1,076,095	2 17
1883	9,219,171	5,722 966	3,496,205	1,746,802	3.53
1884	7,330,900	4,515,400	2,815,500	1,015,500	2.03

Thus the gross earnings for the half-year were the smallest since 1879, and also the working expenses; the net earnings were $222,455 (8¼ per cent.) more than in the very unfavorable half-year 1882, but smaller than in any other years since 1879, and nearly as small as then; and the profit over fixed charges and the profit per share are the smallest since 1877. In 1878, when the road earned 6 per cent. more per share in this half than this year, it paid but $4 per share for the whole year; in 1879, when it earned 36 per cent, more than this year, it divided $6.50 for the year.

The statement made this week says that "the earnings applicable to stock during the first half of the years 1882, 1883 and 1884 do not amount to the two quarterly dividends usually declared in that period, but the deficiency in 1882 and 1883 was made good in the second half. We have every reason to believe that the same will occur in 1884." The reasons that are given for the small profits are extreme competition and low rates in the first half of this year, and the withholding of freight from shipment—doubtless referring to speculations in grain and the large accumulations in Chicago some time ago. But this is an imperfect explanation. The grain which accumulated in Chicago in the winter has for the most part gone forward already, and there never has been a year when the rail shipments were greater in the first half of this year. There has been a great deal of talk of the prevention of exports by speculation; but the exports have been small chiefly because we wanted the grain at home, and the grain has found a market, though there have been unusually small receipts at the seaboard. The accumulations at Northwestern markets are much smaller now than last year at this time. Doubtless the shipments of grain and of all through freight by the Lake Shore have fallen off largely, but the cause is, unfortunately for it, a permanent and not a temporary one—there are more railroads to carry it, and the Grand Trunk is getting a larger share of it. Four years ago the Lake Shore carried about 26 per cent. of the total Chicago through shipments; this year about half that percentage. The traffic has grown but little, and this great diversion of a most important traffic tells severely on the profits of all the older roads, and will continue to do so. It is true that the rates were more unprofitable this year than in any other since 1879, except 1882; but though not well maintained, they left a tolerable profit during the first 2½ months. The loss by the low rates was a real and a serious one; but if rates had been maintained the diversion of traffic was such that there must have been an important reduction in profits, and this must continue. Indeed, the Lake Shore's large investment in the Nickel Plate in a manner compels it to favor a diversion to this one of the new roads, which, like the Old Man of the Sea, has fastened itself on this company's neck.

The Michigan Central statement for the half-year including earnings and expenses of the Canada Southern) compares as follows with last year:

	1884.	1883.	Inc. or Dec.	P. c.
Gross earnings	$5,603,500	$6,740,000	—$1,136,500	16.8
Expenses	4,216,500	4,591,000	— 374.500	8.2
Net receipts	$1,387,000	$2.149.000	— $762,000	36.8
Interest and rentals	1,280,000	1,210,000	+ 70,000	5.8
Surplus	$107,090	$939,000	— $832,000	88.6
Mich. Cen. share	71,333	626,000	— 554.667	88.6
Per share	$0.38	$3.34	$2.96	88.6

The percentage of decrease in earnings is less than on the Lake Shore, but so is the decrease in working expenses; and the decrease in net earnings is nearly 37 per cent. This takes away more than seven-eighths of the profits above fixed charges, which are reduced to 38 cents per share for the Michigan Central, and to 24 cents for the Canada Southern. The gross earnings, expenses, net earnings and profits over fixed charges of these roads in the first half of the year for seven successive years have been:

Michigan Central and Canada Southern earnings and profits in the June half-year for seven years.

Year.	Gross earnings.	Expenses.	Net earnings.	Surplus.
1878	$4,285,628	*$3,172,863	$1,112.763	$126,066
1879	4.605.691	*3,269.318	1,336,373	329.447
1880	6,496.899	4,089.021	2.407.878	1,364,978
1881	6.158,532	4,402,812	1,755,720	563,408
1882	5,568,283	4,473,048	1,095,235	†144,910
1883	6,740,000	4,591,000	2,149,000	939,000
1884	5,603,500	4,216,500	1,387,000	107,000

* For these years the expenses of the Canada Southern for the first half of the year are assumed to be the same proportion of earnings as for the whole year, which is doubtless not quite accurate.
† Deficit.

Thus the gross earnings were smaller than in 1882 even, and the smallest since 1879; the working expenses the smallest since 1880; the net earnings 26⅔ per cent. more than in 1882, but with that exception the smallest since 1879, and nearly as small as then, and the surplus available for dividend smaller than 1878 and 1879 even, and smaller than in any other year except 1882, when there was a deficit. In fact, the two companies have earned but a very small margin over their fixed charges, which absorbed 92¼ per cent. of their net earnings. Certainly the Canada Southern, with its overwhelmingly large proportion of through freight, would have lacked much of earning its fixed charges but for its union with the Michigan Central; for it is the through freight and the rates on through freight that have fallen off, the diversion having been, perhaps, greater from the Michigan Central than from the Lake Shore. But the decrease in gross earnings was 66 per cent. larger on the Lake Shore, which suffers much more from the depression in the iron and other manufacturing industries.

The experience of these two roads shows how seriously the trunk-line connections have suffered from a combination of causes. It is hardly probable that the chief of these was the low rates on through freight eastward. During the whole year 1883 the aggregate gross earnings from this traffic on the Michigan Central and Canada Southern were $2,706,000. With the much smaller share going to this route now, a reduction of one-half in the rate on this traffic for one half of the year would probably amount to not more than about $500,000. But the rate has not been reduced one-half. This line, however, has perhaps carried a considerably smaller share of all the through freight, including west-bound, which was carried at full rates or very nearly, and there has been a lighter local traffic. The diversion of traffic to new lines will be permanent; the low east-bound rates will doubtless be mended, and it is reasonable to expect these rates to be as good for the rest of the year as they were last year, when they were somewhat disturbed in the last half of the year; as for the decrease in traffic due to depression in general business, we can hardly expect a great improvement so soon as the next half-year, though there may be, and according to present appearances will be, an increase in the supply of Western produce to be shipped eastward. This increase may be very large, and with a strong foreign demand at good prices it might cause not only an increase in shipments eastward and more profitable through rates, but a general stimulation of traffic. It is not probable, however, that there will be any great increase in the European demand for our surplus; and if not, these two roads, though likely to have considerably greater profits than in the first half of the year, will hardly do as well as in the last half of other prosperous years, because they have a materially smaller share of the through traffic.

The report of the Master Car-Builders' Convention published last week has perhaps given the impression that Mr. M. N. Forney was appointed to investigate the merits of various car-couplers. That gentleman requests us to say that no such appointment has yet been made, and that all that was done by the Car-Builders' Association was to refer the matter to the Executive Committee with authority to have such an investigation made if the railroad companies would pay the expense of it. Whether or not they will be willing to do so has not yet been ascertained. At any rate Mr. Forney has not and says he probably will not undertake an investigation of the merits of self-couplers, and until he does inventors of such appliances who write letters or seek interviews with him will waste his time and their own too. They are requested by him to do neither.

We publish elsewhere the question paper used in the written examination of the graduate class at Yale College to which Mr. Arthur T. Hadley has been giving instructions in the economics of transportation. The questions are just those which this community is constantly discussing, and for the most part with a plen-

tiful lack of knowledge either of the facts or the principles. It is encouraging to find that some of those who are likely hereafter to influence the public are actually studying these questions, and that there is at least one instructor in the country who has qualified himself to direct such studies, which are not easily followed by independent investigators, because the sources of information cannot be easily discovered, and the literature of it is much scattered and little known.

The Boston & Albany compound locomotive has been finally voted a failure as an economizer of fuel, and is to be changed into the ordinary form, which, from its construction, is a simple matter to do. This engine has *four* cylinders—two high and two low-pressure—one in front of the other on the same piston, the rear (low-pressure) cylinder of about the usual size. It proved a failure simply because it was more expensive to maintain without showing any corresponding economy.

This engine should not be confounded with the Webb compound engine, introduced on the London & Northwestern, which has only *three* cylinders, two outside, high-pressure, actuating the rear drivers, and one inside, low-pressure, actuating the front drivers; by which arrangement coupling-rods are dispensed with. This system, it is reported, is about to be tried on the Continent and in India, but has not been, so far, on other lines in England.

From June 14 to June 23 the fall in the prices of the 37 stocks chiefly traded in on the New York Stock Exchange amounted to no less than $66,332,000, and for the stocks of most companies with very large capital extended into the millions, as follows:

Western Union Telegraph	$7,400,000
New York Central	6,931,000
Lake Shore & Michigan Southern	6,125,000
Chicago & Northwestern	5,040,000
Central Pacific	4,450,000
Chicago, Milwaukee & St. Paul	4,379,000
Chicago, Rock Island & Pacific	4,200,000
Chicago, Burlington & Quincy	4,000,000
Union Pacific	3,641,000
Illinois Central	2,175,000

In many cases the decrease in this time—which was not a time of panic—was as much as a large dividend—7⅞ per cent. on Central Pacific, 10 on Rock Island, 11⅛ on Northwestern common, 9 on Northwestern preferred, 11½ on St. Paul common, 7½ on Illinois Central, 7 on Louisville & Nashville, 12¼ on Lake Shore, 7⅞ on New York Central, 7½ on Manitoba, 6 on Union Pacific, and 9½ on Western Union Telegraph.

Large as these declines are, for most of the stocks they are but a small part of the total decline this year, and still less of the decline since the fall of 1882.

We have now reports of May earnings from eight railroads besides the 59 whose reports we have published heretofore, including the important and extensive Pennsylvania system. Four of the eight show an increase in total earnings, but the more important roads have a small decrease, though the Nashville & Chattanooga reports a gain of 11½ per cent., and the Rome, Watertown & Ogdensburg a gain of 9 per cent., without increase of mileage.

The aggregate mileage and earnings, and the average earnings per mile of the 66 roads that have reported for May so far, are as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Mileage	44,918	41,437	+ 3,481	8.4
Earnings	$23,784,028	$23,460,935	+ $323,093	1.4
Earn. per mile	530	566	— 36	6.4

In view of the general condition of business this is, perhaps, more favorable than was to be expected. Nearly one-fifth of the total earnings were by the Pennsylvania, which has but a trifling decrease; and the report for its great system west of Pittsburgh and Erie, which gives the surplus or deficit, and not actual earnings, shows a comparatively small deficit in May, which, if not caused by cutting down expenses, indicates fair gross earnings in that district, for which information is lacking, as the more important roads in it do not report.

The effect of the low rail rates on lake shipments may be traced from the following statement of the shipments of grain by railroad, river and lake, from the opening of navigation to the middle of June, for four successive years, as follows:

	By rail.	Down Mississippi.	By lake.	Total.
1881..(7 weeks)	11,293,636	3,327,856	23,279,264	37,900,756
1882..(11 weeks)	13,651,263	1,177,746	17,840,815	32,669,824
1883..(8 weeks)	14,151,596	1,718,295	24,079,910	39,949,902
1884..(7 weeks)	17,538,293	1,465,933	14,810,879	33,815,105

The average shipments per week were:

	1881.	1882.	1883.	1884.
By rail	1,613,377	1,241,024	1,768,950	2,505,470
By river	475,408	107,068	214,799	209,419
By lake	3,325,609	1,621,892	3,009,989	2,115,840
Total	5,414,394	2,969,984	4,991,738	4,830,720

Thus the railroads have carried one-half more per week this year than last or 1881, and twice as much as in 1882, though the total shipments have been less than last year or in 1881. This has been at the expense of the lake vessels, which carried weekly 30 per cent. less than last year, and 33 per cent. less than in 1881.

The percentages carried by each in these years have been:

	1881.	1882.	1883.	1884.
By rail	29.8	41.8	35.4	51.9
By river	8.8	3.6	4.3	4.3
By lake	61.4	54.6	60.3	43.8
Total	100.0	100.0	100.0	100.0

Thus the railroads this year have carried more than half of the whole, and very much more than in the other years. The river shipments seem not to have been affected by the low rail rates, for they were as large a proportion of the whole as last year, and they have never since the railroad war of 1881 risen to the proportions that they were just before it. The large proportion carried by the railroads in 1882 was due to the fact that the total shipments were then very small and were mostly required for interior consumption, and so could only be distributed by the railroads. The amount carried by them then was much less than in the other years.

The rail rate this year was 15 cents, against 25 cents in 1883 and 1882, and a nominal rate of 30 cents in 1881, which was so poorly maintained that it was probably equivalent to a rate of 25 cents.

We may assume, then, that, as the average total weekly shipments were nearly the same this year as last, the changes in the amounts going by lake and rail has been due to the difference of 10 cents per 100 lbs. in the rail rate—that if the rate had been 25 cents this year, the railroads would have carried but 1,710,000 bushels of grain instead of 2,505,000, and that the lake vessels would have carried 2,910,000 against 2,116,000. Now as the railroads received about $203,000 a week for carrying the 2,505,000 bushels, and at 25 cents would have received about $231,000 for carrying 1,710,000 bushels; and as it cost something more to carry the larger quantity, it is evident that they would have done better to have let the lake vessels get the grain which the low rail rate diverted from them.

British rail exports to this country have substantially ceased again, as they did during the time of light railroad construction after 1873. The maximum imports in the period of rapid construction previous to 1873 were 505,538 tons, in 1871. The home production was increasing rapidly then, and in 1873 (when the railroad construction was little more than half as great as in 1872, the imports were but 231,046 tons, and they fell to almost nothing in 1876, 1877 and 1878, but revived in 1879, became large in the last part of that year, and enormous in the next three years. For the six years that railroad construction was increasing, the imports were:

1867.	1868.	1869.	1870.	1871.	1872.
145,579	223,287	279,610	356,386	505,538	473,973

Then for six years of declining or light construction the imports were:

1873.	1874.	1875.	1876.	1877.	1878.
231,046	96,706	17,364	256	31	9

During the years of rapid construction since 1878 they have been:

1879.	1880.	1881.	1882.	1883.
39,317	259,544	344,930	200,113	34,800

About five-sixths of the imports in 1879 were in the last half of the year.

In May and the five months ending with May the exports of rails from Great Britain to this country (which make up nearly all our imports) have been for five years:

	1880.	1881.	1882.	1883.	1884.
May	29,273	39,834	11,657	7,652	50
Five months	91,664	126,126	100,578	26,874	8,697

Thus, small as our imports were last year, they are likely to be very much less this year, being in May less than in any other month since early in 1879, and for the five months being 67 per cent. less than last year.

Thus, our own works are now getting practically the whole of the benefit of whatever demand there is in the country, and it is by no means a small one, for simply to maintain 120,000 miles of railroad and about 148,000 miles of track requires a great many rails, in spite of the fact that more than half of the mileage is steel, and a very large part of it new. But works that turned out 1,647,054 tons of rails in 1881, and have been greatly enlarged since, will have no difficulty in supplying all required for maintenance and the construction of several thousand miles of new road in addition without calling on European rolling mills. That they do not intend to call on them is shown by the prices they make, which, after standing at $32 a ton at Eastern mills for some time are said to have gone down to $30 last week, as the result of competition; which evidently cannot be met by European rails at $22 even, with the duty as it is.

Pennsylvania Railroad Earnings in May.

The Pennsylvania Railroad makes a good showing for May, all its lines east of Pittsburgh and Erie having nearly the same earnings and expenses as last year, when the gross earnings were larger than ever before. Compared with last year there was a decrease of $35,833 (0.8 per cent.) in gross earnings, a decrease of $66,653 (2½ per cent.) in working expenses, and an *increase* of $30,820 (2 per cent.) in net earnings. For 12 successive years the earnings and expenses in May have been:

May Earnings and Expenses of the Pennsylvania Railroad for 12 years.

Year.	Gross earnings.	Expenses.	Net earnings.
1873	$3,706,802	$2,759,028	$947,775
1874	3,261,456	2,102,099	1,159,357
1875	2,633,322	1,790 620	842,702
1876	2,982,245	2,099,565	882,680
1877	2,583,447	1,593,943	989,504
1878	2,503,441	1,529,911	973,530
1879	2,708,696	1,674,603	1,034,093
1880	3,417,915	1,941,063	1,476,852
1881	3,856,897	2,168,287	1,688,610
1882	4,108,877	2,342,088	1,766,789
1883	4,303,006	2,694,332	1,608,674
1884	4,267,173	2,627,679	1,639,494

The gross earnings were thus nearly 4 per cent. more than in 1882, 10½ per cent. more than in 1881, and 23 per cent. more than in 1880; but the increase in working expenses has been larger in proportion, and with the exception of last year the net earnings this year were the smallest since 1880. In 1881 the expenses were 56¼ per cent. of the earnings; this year they were 61½ per cent.

The result of the working of the Pennsylvania system *west* of Pittsburgh and Erie in May was that the net earnings lacked $47,754 of meeting the interest, rentals, etc., which is not far from the result last year in the same month. The surplus or deficit of this system in the month of May for six years has been:

1879.	1880.	1881.	1882.	1883.	1884.
Deficit.	Deficit.	Surplus.	Deficit.	Deficit.	Deficit.
$219,733	$22,847	$143,658	$75,586	9,058	$47,754

Thus it appears that May has usually been a month of loss for this western system. The amount this year is a mere trifle, the gross earnings of the system averaging something like $2,500,000 monthly. The heavy east-bound traffic has tended to make the gross earnings of this system larger than usual since March, in spite of the low rates. The large deficit in 1879 was made when east-bound rates were lower even than this year, but when expenses were much less.

For the five months ending with May the Pennsylvania system east of Pittsburgh and Erie reports a decrease of $768,633 (3.8 per cent.) in gross earnings, a decrease of $458,165 (3.6 per cent.) in working expenses, and a decrease of $300,468 (4.2 per cent.) in net earnings.

For the five months ending with May the earnings and expenses of the lines east of Pittsburgh and Erie have been, for eight successive years:

Pennsylvania Railroad Earnings and Expenses, Five Months to May 31.

Year.	Gross earnings.	Expenses.	Net earnings.
1877	$11,890,523	$7,994,149	$3,896,071
1878	12,071,738	7,630,173	4,441,565
1879	13,023,249	7,778,588	5,244,661
1880	16,212,596	9,130,634	7,081,962
1881	17,746 400	10,237,991	7,508,413
1882	18,557,096	11,901,503	6,555,593
1883	20,195,713	12,856,225	7,339,488
1884	19,427,080	12,398,060	7,029,020

The gross earnings, though less than last year, were 6 per cent. more than in 1882, when they were larger than ever before, but the increase in working expenses has been such that the net earnings were the smallest since 1879, with the exception of 1882. Since 1880 the increase in gross earnings has been $3,215,000 (20 per cent.), but the increase in working expenses meanwhile has been $3,268,000 (35¾ per cent.) In 1880 the expenses were 56.3 per cent. of the earnings; this year, 63.8 per cent.

The lines west of Pittsburgh and Erie for the five months this year show a deficiency in meeting all liabilities amounting to $393,562, which is the worst showing they have made for the time since the reports began, in 1879, though doubtless not nearly so bad as in some earlier years. For six years the surplus or deficit of this system for the five months ending with May has been:

1879.	1880.	1881.	1882.	1883.	1884.
Deficit.	Surplus.	Surplus.	Deficit.	Surplus.	Deficit.
$166,950	$1,294,230	$1,553,769	$58,315	$391,904	$393,562

Thus compared with last year there is a decrease of $755,526 in the profits of this western system. Adding the profits of the western system to the net earnings of the eastern system, we have as the Pennsylvania Railroad Company's profits from the two systems:

1879.	1880.	1881.	1882.	1883.	1884.
$5,077,711	$8,376,192	$9,062,182	$6,587,278	$7,731,452	$6,665,458

The profits this year are thus $1,065,994 (13⅓ per cent.) less than last year, $78,180 (1.2 per cent.) more than in 1882, $2,396,724 (26 per cent.) less than in 1881, $1,710,734 (20 per cent.) less than in 1880; but compared with 1879 there is an increase of $1,587,747 (31 per cent.).

The decrease from last year is at the rate of 1⅓ per cent. on the present capital stock of the company, and the decrease since 1881 is more than 3 per cent. on the stock as it stood after the increase in it authorized in May that year. There has been an increase of about $25,600,000 in the stock of the company since the beginning of 1881, and of $16,800,000 since May, 1881. The increase in mileage has not been great, nor that in fixed charges, but to keep up dividends at the old rate requires nearly 22 per cent. more money than in 1881, and 37 per cent. more than in previous

years. This increase of capital is of prime importance in estimating the prospects of dividends. Because the increase in mileage has not been great the road seems to be doing well when it earns as much as last year; but the addition to capital has been such that considerable increase in profits is necessary to make the same percentage of profit. It is to be remembered, however, that last year the report showed a surplus of $2,550,000 after paying all charges and dividends.

Cotton Crop Prospects.

The *Commercial and Financial Chronicle* in its last issue gives an elaborate account of the acreage and condition of the cotton crop, based on its own investigations. It does not accept the reports of acreage by the Department of Agriculture for the last two years, but, beginning with the census report of acreage in 1879, its estimates are:

1879.	1880.	1881.	1882.	1883.	1884.
14,442,000	16,123,000	16,851,000	16,590,000	17,449,000	17,834,000

While those of the Department of Agriculture have been:

1879.	1880.	1881.	1882.	1883.	1884.
14,442,000	16,120,000	16,851,000	16,276,000	16,777,000	17,447,000

Thus the *Chronicle* makes the decrease in acreage from 1881 to 1882 261,000 acres (1⅝ per cent.), while the Department gives it as 575,000 acres (3½ per cent.); then the increase from 1882 to 1883, which by the Department was 501,000 acres (3 per cent.), by the *Chronicle* was 859,000 acres (5⅛ per cent.). The preliminary estimate of the Department of Agriculture, June 1 this year was that the acreage had increased 4 per cent. over last year; the *Chronicle* makes the increase only 2¼ per cent. The result is that the acreage according to the *Chronicle* was 672,000 *more* than according to the Department last year, and is 387,000 more this year.

The National Cotton Exchange reported June 1 no change in acreage, and *Bradstreet's*, which last week gave estimates based on 1,203 local reports from 613 out of the 650 counties that had more than 500 acres of cotton, shows an average increase of 330,000 acres, against 387,000 reported by the *Chronicle*.

It may be said here that for nearly all purposes it is much more important to know correctly the percentage of increase than to know the actual acreage, which latter can hardly be ascertained without an actual census. But producers, traders, carriers and consumers can calculate the probable effect on themselves better if they know there is an increase of 2¼ per cent. than if they know there is an increase of 387,000 acres, and it is therefore not a matter of the greatest importance which estimate of the acreage is nearest right. A constant under or over-estimate of 1 per cent. or less will, from one census to another, make an enormous difference in the acreage reported, as resulted in 1879, when the result of the successive estimates of the Department of Agriculture was an estimate of 53,085,000 acres of corn, while the census showed that actually there were 62,369,000 acres—17½ per cent. more than the estimate. But no one was much misled by this. The Department had allowed an average yearly increase of 3½ per cent, while the actual average yearly increase had been nearly 5½ per cent. The excess of the actual over the estimated crop in 1879 was about 240 millions of bushels, but people based their calculations always on the crop of the previous year and the effect that had on trade and industry, and if they had prepared for an increase of only 3½ per cent. while the actual increase was 5½, they were not much out of the way, though the aggregates they supposed the country to be dealing with were very much out of the way.

The *Chronicle* finds no increase of acreage in North Carolina, 1 per cent. in Georgia and Tennessee, 2 per cent. in South Carolina and Mississippi, 3 per cent. in Florida and Alabama, 4 per cent. in Arkansas, and 5 per cent. in Texas, with a decrease of 2 per cent. in Louisiana, and 10 per cent. in the small remaining cotton-growing country, which altogether have less than ⅝ per cent. of the whole. In view of the fact that the population of Texas has not increased as fast lately as for some years previous, and that the weather prevented some planting there, the increase of 5 per cent. seems a liberal one; but it is still a much smaller increase than it has been credited with for several years, its increase from 1878 to 1883 having been no less than 56 per cent., at the average yearly rate of 9½ per cent. In a new country the extension of acreage continues long after the population has ceased to grow rapidly, as the new-comers can only gradually get their farms under full cultivation.

As to condition, the *Chronicle* reports the plant late and small, but generally healthy and well cultivated except in western Mississippi, Louisiana, Texas, and part of Arkansas, where protracted rains made it very late and prevented cultivation, though since May good weather has caused a great improvement there.

This is not very different from the condition at the same time a year ago, though east of the Mississippi the condition is somewhat better. The injury to the crops last year came later. With favorable weather the crop may be equal to the largest (in 1882), though it will have to be very favorable west of the Mississippi to prevent a considerable falling-off there, not from last year's crop, which was very bad, but from that of 1882, which was most excellent.

The through and local shipments eastward of flour, grain and provisions from Chicago, by the imperfect report to the Board of Trade, were 53,035 tons during the week ending June 21, against 27,215 tons in the corresponding week of last year, and 18,729 in 1882. The shipments and the percentage going by each route for six successive weeks have been:

	Week ending					
Tons:	May 17.	May 24.	May 31.	June 7.	June 14.	June 21.
Flour	7,877	6,914	5,922	6,299	5,106	6,759
Grain	32,376	37,327	37,905	34,782	43,146	38,104
Provisions	6,678	8,434	8,391	9,534	7,925	8,172
Total	46,931	52,675	52,218	50,615	56,177	53,025
Per cent.:						
C. & Grand T.	20.0	25.3	15.0	18.4	13.2	16.0
Mich. Cen	10.0	14.4	12.9	11.4	13.4	12.9
Lake Shore	16.7	13.9	18.1	14.5	15.0	11.2
Nickel Plate	11.9	10.2	10.8	8.1	11.6	10.5
Ft Wayne	14.2	12.4	16.3	17.3	13 7	15.2
C., St. L. & P	7.8	5.5	9.1	7.5	7.8	10.5
Balt. & Ohio	8.6	9.6	9.3	12.3	13.3	12.5
Ch. & Atlantic	8.9	8.7	8.5	10.6	12.1	11.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

The shipments last week were very evenly divided, the older roads having little advantage over the newer ones, the Lake Shore carrying the same as the Chicago & Atlantic and little more than the Nickel Plate. The three Vanderbilt roads together carried 34.6 per cent. of the whole, and the two Pennsylvania roads 25.7.

There was but one day for shipments at the 15 cent rate after last week, but this seems not to have stimulated shipments, which were less than the week before, but about equal to the average for two months past. A decrease must be expected this week in consequence of the advance in rates. The fact that there is a scarcity of lake tonnage will probably prevent as large a decrease as there would otherwise be, however. This scarcity has lasted some ten days, and is difficult to explain, for in comparison with previous years lake shipments have been small.

The number of immigrants arriving in the United States in May and in the five months and eleven months ending with May are reported by the Bureau of Statistics as follows:

	1881.	1882.	1883.	1884.
May	117,269	141,035	99,601	82,581
Five months	292,976	357,279	246,811	215,855
Eleven months	563,151	685,634	517,293	454,206

Thus for the month, the five months and the eleven months the immigration was less this year than in any other of the four. In comparison with last year the decrease was 17 per cent. in May, 12½ per cent. in the five months and 12¼ per cent in the eleven months. The immigration is by no means small, however. Indeed the arrivals for the eleven months of the fiscal year ending with May this year are nearly the same as for the whole year ending with 1880, and larger than in any other year but one (1873) in the history of the country.

May is usually the month of largest immigration. It was so in each of the last three years. In 1881, 16½ per cent.; in 1882, 19¾ per cent.; and in 1883, 17¾ per cent. of the arrivals of the year were in May. At last year's rate the arrivals will be 464,540 this year, which is more than in any other year previous to 1881. It will not be surprising, however, if the immigration falls off more rapidly in the last half of the year, and it is probably desirable that it shall, as the railroad and other construction which afford a large part of the demand for common labor has largely fallen off.

Railroad construction is less than last year in most parts of the world, if we may judge by the exports of rails from Great Britain to different countries, which for the five months ending with May have been:

	1882.	1883.	1884.
Sweden and Norway	2,211	7,233	20,160
Italy	27,545	31,700	3,630
Other European countries	10,738	7,288	10,632
Europe	40,494	46,221	34,322
Brazil	20,290	13,662	19,241
Argentine Republic	15,799	37,510	27,612
Chili	1,382	3,026	7,190
Peru	462	7,668	3,699
South America	37,933	55,866	57,742
Mexico	13,692	13,341	2,519
Canada	16,616	20,780	11,521
Australasia	30,111	49,661	52,957
South Africa	11,615	16,183	7,027
East India	51,455	70,557	39,513
All but United States	219,574	299,990	233,522

Though the aggregate exports to countries other than the United States were 22 per cent. less this year than last, they are still nearly 7 per cent. more than in 1882.

It will be seen that the exports to European countries are but trifling, and nearly three-fifths of these this year went to Sweden and Norway, while the great railroad countries of Europe took no rails, or next to none, from England. Probably the requirements for renewals alone in Europe were at the rate of more than 350,000 tons for these five months.

The South American countries, except the Argentine Republic, took more rails this year than last, and 50 per cent. more than in 1882, but Mexico not one-fifth as many, and all the English colonies, except the Australasian, much less than last year. The British colonies took 46 per cent. of the total British exports this year, 48 per cent. last year, and 34 per cent. in 1882. Aside from these and Great Britain itself there is no great market left for British rails.

The New York & Greenwood Lake road, like the New York City & Northern, is a notable example of the fact that a road cannot be expected to pay simply because it has its terminus at a great city. The road has now been built for some ten years; it passes through a series of pleasant suburban towns and reaches one of the most beautiful mountain lakes in the New Jersey hill country—certainly the most picturesque spot within an equal distance from New York. But the road has twice been through bankruptcy and for several years past has barely paid its running expenses. Nothing is paid on its bonds, and the taxes and interest on floating debt have been met only by advances made jointly by the Erie Company, which derives some advantage from its terminal payments, and by Cooper & Hewitt, who need the road as an outlet for their iron mines and furnaces near Greenwood Lake. There is, moreover, no prospect of any improvement, for the travel to Greenwood Lake is necessarily limited to two months of the year; the iron traffic is not likely to grow in the present condition of that trade and the increasing competition of districts which are better placed for cheap working, while the suburban business, to secure which the road was chiefly built, is all from places which are reached by other lines, with which this road is entirely unable to compete, simply because it cannot afford to give their residents the facilities which the older and better supported lines offer them. Suburban traffic, at best, is an expensive business to conduct, and a road which depends upon that alone will find it hard to live in competition with other lines which have other and more profitable business to support them.

The fact is, the road was built in the first place chiefly as a real-estate speculation, and the speculators were enabled by circumstances to get other people to build their road. Some benefit, though not as much as expected, has resulted to real-estate on the line, but the money with which the road was built has been a dead loss.

The latest notable bridge catastrophe, on the Burlington & Missouri River Railroad, by which 30 persons were killed and injured, furnishes a very prompt practical proof of what we said in our issue of June 9 in respect to bridge floors. If the accident is correctly reported, it was a peculiarly atrocious case of malicious derailment and apparently may not unfairly be classed among those which it is difficult or impossible to prevent entirely. Yet there are precautions of known efficiency, which, if in use, would probably have prevented the disaster. According to the report, the rails on one side had been maliciously loosened close to a bridge, the spikes and fish-plates removed and some fence-wire inserted in the bolt-holes so that the rails could be suddenly spread on the approach of the train. The programme was successfully carried out, and the expected derailment followed. The locomotive, however, according to the report, did not leave the ties while on the bridge, and passed entirely across it, but produced such serious vibration and shock in passing over the bridge as to cause its fall, and the consequent death or injury of thirty of those who were in the cars which were precipitated into the river.

The first moral, of course, is that no bridge should be so weak as to fall under the circumstances stated, but had the trifling expense been incurred of placing the ties only two or three inches apart, as suggested in the article referred to, the shock to the bridge would have been but little greater than if the train had remained on the rails, and the chances of a train passing safely over under such circumstances without leaving the ties would have been, it is safe to say, materially greater. Finally, had some re-railing device like Latimer's safety-guard been in use on the bridge, a train derailed in this manner so near to it would have been almost certain to have returned to the rails at once. The cost of such devices is so trifling that it is surprising that they are so frequently omitted, or perhaps it would be more correct to say, so rarely used.

The New York, West Shore & Buffalo Railway is equipped for 11 miles near West Point with electric block signals. Great precautions and large expense were incurred in order to pass West Point without interfering with the facilities for artillery practice, which was so far accomplished that nothing but a wild shot can touch the track or a train upon the track. A wild shot was fired, however, a few days since, and a 400-lb. shot struck one of the 67-lb. rails. The long angle fish-plates broke, and the rail was forced out in the middle into a U form. Danger signals were immediately set in both directions by electric apparatus, which, if a train had been approaching within a little distance, would doubtless have prevented a serious accident.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Bangor & Piscataquis.—Extended northward to Moosehead Lake, Me., 14 miles.

Pennsylvania.—Track is laid on the new *Schuylkill Valley Branch* from Manayunk, Pa., to Spring Mill, 4 miles.

Pittsburgh, McKeesport & Youghiogheny.—Extended from New Haven, Pa., to Connellsville, 2 miles.

Wisconsin, Iowa & Nebraska.—Extended from Wilson, Ia., eastward to Cedar Falls, 7 miles.

This is a total of 27 miles of new railroad, making 1,104 miles reported to date for the current year. The total track reported laid to the corresponding date for 12 years past is as follows:

	Miles.		Miles.
1884	1,104	1878	606
1883	1,966	1877	618
1882	4,166	1876	673
1881	1,972	1875	407
1880	1,899	1874	637
1879	761	1873	1,408

These statements include *main track only*, no account being taken of second tracks or other additional tracks or sidings.

NEW PUBLICATIONS.

Michigan Association of Surveyors and Civil Engineers—Proceedings at Fifth Annual Meeting.

If this Association can continue to get out as creditable volumes of proceedings as this thick pamphlet it will amply

justify its existence. Among the papers of interest to railroad men are: "Timber Trestle at Grand Rapids," by Geo. Marson, C. E.; "Notes on the Construction and Equipment of Narrow-Gauge Railroads," by A. L. Reed, C. E., and "Drainage of Large Marshes," by C. E. Hollister. The proceedings of the third and fourth annual meeting also contain matter of permanent value. Prof. R. C. Carpenter, Secretary, Lansing, Mich, writes us that a limited number of each of thes threee pamphlets can be obtained of him at 30 cents each.

Descriptive Catalogue of Osgood Dredge Company. Albany, N. Y. 1884.

It is seldom that one sees a trade circular more strictly business-like and satisfactory than this. It impresses one as made with the sole idea of conveying information, and it does do so very fully, since all the leading forms of dredges and steam shovels are shown by working drawings, including their details, with tabular records of performance. This is the shrewdest form of advertising, both because it insensibly conveys the idea to the reader that all the proprietors ask is to have the character and design of their manufactures fully understood, and because it gives such correct and definite information as to insure the preservation of the catalogue. If manufacturers more generally followed the same practice, they would probably be benefiting their own interests, and they would certainly be adding much to the convenience of their customers.

But why do publishers of such drawings so generally neglect to add a scale?

Summer Homes in the Mountains.—Issued by the Passenger Department of the New York, Ontario & Western Railroad.

This is an unpretentious but neat and complete guide-book to the region reached by the railroad in whose interest it is issued. The lower end of the road, running from Weehawken to Cornwall, is used in common with the New York, West Shore & Buffalo, but beyond Cornwall the road runs through a very picturesque and attractive region of its own. From Cornwall to Middletown it passes through the pastoral valleys of Orange County, and beyond Middletown it traverses the wild country on the upper branches of the Delaware and in the Shawangunk Mountains, and reaches by its branches the western spurs of the Catskill region. Much of the country on the line is not so well known as it deserves to be, and those who may be led to explore it by this book will probably not regret it. The book is neatly made and of convenient size, and contains much information that will be useful to the summer traveler.

Through the Housatonic Valley to the Hills and Homes of Berkshire. Issued by the Housatonic Railroad Co.

The Housatonic Railroad reaches and runs through one of the most beautiful mountain regions of America, the Berkshire Hills. On its way to them from Long Island Sound it follows the picturesque valley of the Housatonic, so that almost the whole length of the road is in a country especially adapted by nature for a summer resort. It is to call attention to this fact that this little book has been issued by the company. The book is well gotten up and has many engravings, fairly executed, of well-chosen points on the line of the road. It is well adapted to lead the summer traveler to wish to know more of the country whose advantages it is intended to set forth.

Transportation in Congress.

In the House on June 19th:

The House resumed consideration of the Pacific Railroad bill, Mr. Thompson (Kentucky), who had charge of the bill, having an hour to close the debate. He yielded part of his time to Mr. Dunn (Arkansas), who advocated the majority bill, and characterized the minority bill as a scheme that came from the railroad companies themselves, and that would give them 60 years' time to invent a plan how to cheat the government.

Mr. Millard, of New York, favored the majority bill as one that would protect the government.

The first question was on the amendment offered by Mr. Thompson, to make the aggregate yearly contribution of the Central Pacific Company 55 instead of 35 per cent. of the net earnings, and that of the Kansas Pacific 45 per cent. The amendment was agreed to. The question was then taken on the minority bill, and it was rejected.

Mr. Hewitt (New York) moved to recommit the bill, with instructions to report by the third Monday in December a bill by which the sinking funds of the companies shall be enlarged by additional payments, so that the debt due the government may be surely paid at maturity.

The motion to recommit was rejected—65 to 84.

The bill was then passed without a division.

In the Senate on the 20th:

The Chair laid before the Senate a communication from the Secretary of the Interior furnishing information, in compliance with a recent resolution of the Senate, relating to the appointment of commissioners to examine sections of the Northern Pacific Railroad and the issue of patents for land for that road.

In the House on the 20th:

On motion of Mr. Washburn (Minnesota), a Senate bill was passed authorizing the construction of bridges across the Mississippi River at St. Paul.

Several amendments were adopted, which necessitates the return of the bill to the Senate.

On motion of Mr. Struble (Iowa), a bill was passed forfeiting the unearned land grant to the Sioux City & St. Paul Railroad Co.

In the Senate on the 21st:

The Chair laid before the Senate sundry bills received from the House of Representatives. Among these was a bill amending the Thurman act relating to the Pacific railroads.

Mr. Van Wyck (Nebraska) desired this bill referred to the Committee on Public Lands rather than to the Committee on the Judiciary. It was with some surprise that he had for the first time learned from the public press that the Judiciary Committee had resolved not to act on any bill of this kind this session. He supposed we should express our acknowledgments to the press for having given the Senate this information. It would naturally be supposed that a committee of the Senate would have made its report first to the Senate itself as to whether it would or would not act, and particularly when this conclusion had been reached after a conference with the railroad company.

After some further discussion Mr. Van Wyck withdrew his motion and the bill was referred to the Committee on the Judiciary.

The House bill granting right of way through the Indian Territory to the Gulf, Colorado & Santa Fe Railroad Co. was read a third time and passed.

University Instruction in Transportation Questions

The following is the examination paper of the class of Mr. Arthur T. Hadley, Instructor in Political Science, at Yale College, used in the examination this month, which will give an idea of subject-matter of the instruction:

ECONOMICS OF TRANSPORTATION.

1. Explain and criticise the expressions:

"The *ordinary laws of trade* do not operate in the case of railroads."

"In place of the old theory of fair rates, based upon *cost of service*, they have adopted the new principle of charging *what the traffic will bear*."

2. What *forms of discrimination* are complained of? How far are they justified? Criticise the bills which have recently come before Congress.

3. Railroad *pools*—their purpose and history. Are they contrary to public policy?

How do the interests of the seaboard cities conflict?

4. What is the "*construction account*?" How may it be artificially increased or diminished, and with what purposes?

What is stock watering? Its different forms and objects. Does it affect rates?

Is the principle of *limitation of dividend* a good one? Reasons for your opinion.

5. Compare the history of the *railroad commissions* of England, Massachusetts and the Granger states. Mention states which now have commissions of the latter class.

Should the tax valuation of railroads be based upon an assessment of the property or of the securities? Reasons. How far do the two practices prevail?

6. What is the relation of the state to the railroads in France, Prussia, Belgium?

Company railroads, telegraphs and post office, as subjects of state management.

7. *Land grants* to railroads—their history—arguments for and against them.

Subsidies to shipping in England and the United States. Their history—arguments for and against them.

8. The English *navigation laws*—their history. How far is the principle maintained in the United States?

Causes of the *decline of American shipping.*

Receivers' Certificates.

Prominent among the events of the week affecting investors' confidence in Wall Street values has been the issue of receivers' certificates by the Wabash Railroad for its floating debt. This is not a wholly new legal procedure, as the courts have already passed upon cases somewhat similar; but that such a course is possible, is new to the large body of bondholders, and it has consequently disturbed the sense of safety and security hitherto felt by them. Shoving in new bond issues ahead of stock is a complaint of long standing—a well known contingency; but shoving in ahead of bonds receivers' certificates for debts contracted before the receiver was appointed is quite a new sensation to the average investor. Several questions arise out of this incident.

The first of them is eminently practical, directly affecting banks and individuals holding the indorsed notes of the Wabash Railroad. As is well known, such notes have for some time been outstanding, and in considerable amounts. They carry on their back several well-known names, so that they are believed to be perfectly secure. But now the proposition is presented to the holders of accepting, in place of the present obligations, receivers' certificates similarily indorsed. This would be a perfectly unobjectionable arrangement if the certificates are legal; and to some minds it may appear that in any event the new contract would be no less secure than the old one. The line of reasoning which one might adopt is that, as the responsibility of the Wabash Railway is of no account, and as the dependence is wholly on the indorsers, a new instrument which is claimed to be a first lien on the whole Wabash property, with the same indorsers, is at least equally good. That argument is probably without a flaw unless the courts should finally hold that these certificates are wholly void. In that case it is wise to remember that the original promise would virtually drop out of existence, and the indorsements would go with it—that is, the indorsers would be released. Of course, if the original notes are protested and still held, and the certificates taken simply as collateral security while extending time of payment, the danger would be avoided. But it may be asked, is there any doubt about these certificates, their issue having been authorized by the courts? Perhaps not, and perhaps also it is possible that even if the courts should decide that the certificates are not a first lien, it might still be held that they constitute a legal contract sufficient to support an indorsement; that we say is possible, though we fail to see how such an instrument could be collected or what name would be given it, if its illegitimacy as an offspring of the receiver is once established. Yet all things are possible in law, so we do not care to raise that question. It is immaterial, for no one wishes to run a risk if there is any, and we think there is in the present case. That is to say, we fail to understand how a certificate like this, to take the precedence of the mortgage lien, could be authorized in any proceeding in which the bondholders were not actually or constructively parties. Had the receivers been appointed in an action brought to foreclose the mortgage, then such officers would represent the interests of the mortgagees, and the idea under which courts have authorized such certificates would find nominal support at least. But as the case now stands it is certainly doubtful what basis there is for the claim that these instruments are regular receiver's certificates forming a first lien on the Wabash property.

One single thought more we would like to present, and we do it in the interest of the investor, or, more correctly speaking, in the interest of the country's development, because the inviolability of the investor's security is the inducement which brings capital here, and for railroad building we want all the capital we can get. The thought we had in mind is whether it is not about time that our courts put a more restricted construction on this power to issue receivers' certificates. The theory on which such instruments rest, is that their issue is made by a receiver who is the agent of the bondholder, and that it is done solely to conserve his interests, for they permit the paying of wages and the running of the road while the questions affecting the property under foreclosure are being adjudicated. To that extent it is obvious that they are perfectly proper; and yet even in such cases the exercise of this authority should be jealously guarded, for though in theory the receiver is the representative of the bondholder, in practice now a days it seldom is so.

But passing that point, it is difficult to see any justification for the ruling that floating debt incurred prior to the receivership proceedings should be in this manner made a first lien. We know of course the argument—it is only an extension of the principles noted above, which support all such issues. Yet how wide such an interpretation of the law opens the door to fraud and how very precarious it makes the securities of a road which has dishonest managers. Suppose those who are in control of a property wish to make a few millions easily—first they sell out all of the securities that they hold; next they sell them short; next they lavishly incur debt in what is called the management of the property, which is readily done and covered up so that it cannot be uncovered. Finally, they secure the appointment of a receiver and procure authority for him to pay their debt in certificates. This plan well worked would permit the making of a snug little sum in a brief period. Of course also (which is the greater evil aside from the question of public morality) the bondholder's security is thus very greatly impaired, all the stock and bonds decline materially, and then, at the lowest figures, the old parties take hold again and reorganize the company.

We do not make these suggestions with reference to any particular road or men, or with reference to anything that has been hitherto done. It is sufficient for our courts to know that all this, and more, too, is possible under the wide, and, as we think, strained ruling they are giving to this principle. They thereby neither promote good morals, public rights, nor bondholders' interests, but contravene all of them. What sufficient excuse can be offered, therefore, for extending the principle back so as to cover debt contracted before the receivers' appointment?—*Commercial and Financial Chronicle, June 21.*

TECHNICAL.

Locomotive Building.

The Roanoke Machine Works at Roanoke, Va., which were built to do repairs and new work for the Norfolk & Western and the Shenandoah Valley roads, have a capacity in excess of the present demands of those roads, and will undertake the building of locomotives for other lines. These shops are extensive and well planned, and are provided with tools of the latest and most approved patterns.

The Pennsylvania Railroad shops at Altoona, Pa., are building a number of new engines for the road.

Car Notes.

The Pullman Car-Works in Pullman, Ill., have completed 12 new passenger cars for the Lake Shore & Michigan Southern road.

The Cayuta Wheel & Foundry Co. loses the services of Mr. Moses Lyman on July 1. He has been Treasurer for 12 years and Superintendent also for four years past.

The Western & Atlantic shops in Atlanta, Ga., have just completed a new postal car for the road.

The Barney & Smith Manufacturing Co. in Dayton, O., recently completed four new first-class passenger cars for the Western & Atlantic road.

The shops of the Central Railroad, of Georgia, at Macon, Ga., are building an elegant private car for President Raoul.

Bridge Notes.

The Penn Bridge Works in Beaver Falls, Pa., have taken a contract for an iron highway bridge at Treichlerstown, Pa., to have three spans of 135 ft. each. They have also taken a contract for a highway bridge at Mansfield, Pa., over Chartiers Creek.

The Berlin Iron Bridge Co. at East Berlin, Conn., has taken the contract for an iron highway bridge over the Piscataquis River at East Dover, N. H. It will have one span 150 ft. long.

Iron Notes.

The rolling mills of the Philadelphia & Reading Co. in Reading, Pa., shut down June 19, and it is thought that they will remain closed for at least two months.

The Clymer Iron Co. has put its Oley Furnace, in Berks County, Pa., in blast. This furnace was built in 1772.

The rolling mill of the Bethlehem Iron Co. in Bethlehem, Pa., turned out 10,000 tons of steel rails in May.

The St. Louis Ore & Steel Co. has put its Jupiter Furnace in South St. Louis out of blast for repairs. The company's furnace at Pilot Knob, Mo., is in blast.

The Cambria Iron Co. of Johnston, Pa., is constructing a train of 48-in. blooming rolls, the foundations for which are about completed. The train will be operated by a pair of engines, 44-in. cylinder and 60-in. stroke, geared 2½ to 1, built by the Southwark Foundry & Machine Co., of Philadelphia. They have the link reversing motion. The train has not yet been entirely completed. It will be two-high, and is designed to handle the large ingots which practice at Cambria has shown to give the best structural material. These are among the largest rolls in the world, only two other works, so far as known, having rolls equal to them. Bolckow, Vaughan & Co. have a 48-in. train at Eston, England, and the Bethlehem Iron Co., of Bethlehem, Pa., has a blooming train 48-in. in diameter on pitch line, three-high.—*Iron Age.*

The Helmbacher Forge & Rolling Mill Co. in St. Lonis is running two of its hammers on car axles. The bar iron mill is also at work.

A. Garrison & Co. in Pittsburgh recently delivered to Park, Brother & Co. in the same place a chilled roll 32 in. in diameter and 115 in. long. They are making another 20-in. diameter and 122 in. long for the Otis Iron & Steel Co. in Cleveland.

Manufacturing Notes.

Messrs. Frost & Peterson, of No. 628 West 30th street, New York, are making a patent inlaid veneer seating for cars, stations and similar purposes, which is meeting with much favor among railroad and steamboat men, judging from the large number of orders received.

In the suit of Rumsey and others against M. M. Buck, of St. Louis, for an alleged infringement by the latter upon a patent for a track drill issued in 1878 to Underwood and others, the United States Court at St. Louis on June 3 dismissed the bill. The points made in support of this action by the Court were: 1. That complainants had no interest in the patent on which to maintain the action; and 2, that there was no infringement. The defeated parties are manufacturers of the Beland drill.

The Rail Market.

Steel Rails.—The market is dull and the sales reported are only of small lots. Quotations are still nominally $32@$32.50 per ton at mill, but concessions are made without much difficulty on desirable orders. No large orders are reported on the market.

Rail Fastenings.—Quotations continue nominally as before at $2.35 per 100 lbs. for spikes in Pittsburgh, and $2.50@$2.75 for track-bolts. Splice bars are quoted at

1.65@1.75 cents per pound. The demand is very light and orders can be placed at lower rates.

Old Rails.—The market for old iron rails is very unsettled, and sales are reported at $18@$19.50 per ton at tidewater, with light demand.

British Rail Exports.

Exports of steel and iron rails from Great Britain to the United States and to all countries for the month of May, and for the five months then ending, are reported as follows by the Board of Trade, in tons of 2,240 lbs.:

To United States:

	May			Five months		
	1882.	1883.	1884.	1882.	1883.	1884.
Iron rails	2,140	130	.. ....	20,567	2,299	.....
Steel rails	9,517	7,522	50	80,011	24,575	8,697
Total	11,657	7,652	50	100,578	26,874	8,697
To all countries:						
Iron rails	5,418	2,292	1,886	31,485	13,379	6,035
Steel rails	66,025	66,949	64,829	288,667	313,485	236,184
Total	71,443	69,241	66,715	320,152	326,864	242,219

Thus the exports to the United States in May this year were next to nothing, only 50 tons, which is the smallest since early in 1879. This contrast with the imports of the two years previous is great, but still it does not show the extent of the decline in the demand for British rails, for in 1881 the British exports to this country in May were no less than 39,834 tons, or *seven hundred and ninety-six times* as much as this year, and in 1880 they were 29,273 tons. For the five months the decrease is less striking, our takings being about one-third those of last year and 8¾ per cent. those of 1882.

The British exports to all countries for the five months were this year 26 per cent. less than last year and 24 per cent. less than in 1882. Compared with last year there is a great decrease in the exports to Italy, Mexico, Canada, South Africa and East India, an increase of 6½ per cent. in those to Australia, of 41 per cent. in those to Brazil and of 180 per cent in those to Sweden and Norway.

A New Elastic Packing.

The Elastic Packing Manufacturing Co., of Jersey City, is making, and has succeeded in largely introducing, a journal-box packing composed of cocoanut fibre and jute. These materials are passed through a series of chemical baths which cleanse them and extract the natural gums and oils, so that the fibres consist of empty tubes which have a strong capillary attraction for oil, syphoning the oil through the tubes. The cocoanut fibre, being resilient, holds up the jute, which, being the absorbent, carries the oil without the aid of mechanical springs. The two components are thoroughly mixed by special machinery, and the last treatment the packing receives before being ready for use renders it very nearly non-inflammable—sufficiently so to prevent the possibility of spontaneous combustion or ignition from sparks. Nine pounds of the compound, either before or after saturation with oil, occupies the room of 15 pounds of wool or cotton waste.

Iron Production in the South.

Following are some points of interest that came under our Chattanooga representative's notice while on a visit to Birmingham, Ala., last week: Eureka furnaces are in full blast. The company is sold ahead about six months. Woodward Furnace is blowing full with a fair show of orders. Alice Nos. 1 and 2 are in full blast, making about 140 tons per day, chiefly forge irons. The company has 1,500 tons on the bank and 6,000 tons contracted for. Orders at present prices are declined. The contracts and orders booked will keep the furnaces at work for six months. What foundry is put out commands about $16.50 per ton at furnaces, cash. Sloss furnaces have been fully overhauled. One stack is in and one ready to blow in as soon as the market will justify. No. 2 will not be lit up until more favorable markets appear. The make is about 106 tons daily. The overhauling was done by Mr. A. Evans, Jr., blast furnace expert, of Birmingham, and is a very excellent piece of work. The company has 200 tons in the yard, and orders for 6,000 tons ahead, and is out of the market for the present. It makes forge iron. The Mary Pratt Furnace is in first-class condition, but out of blast on account of the market. The company is in no hurry to go in. It could not now secure orders without cutting under the present low rates, and there is little money in the business at its best. Edwards Furnace is out for the same reason. The time this plant will be put in depends entirely on the trade. Three new stacks are projected in the Birmingham District, and will be built within the next two years.

The Linn Iron & Machine Works are running about two-thirds full, mostly on hoisting and mine machinery. This company made the engines, four in number, of the Sloss furnaces, and better blowing machinery is not to be found in the country. The company is very fully equipped for the making of heavy enginery, and its products are very creditable to the management. Birmingham Foundry is making about 10 tons of finished material per day, mostly cast pipe. The company has projected an extension that will increase the capacity to 70 tons daily. The manager has declined orders for 750 tons in May on account of lack of facilities to fill them. The rapid advancement of Southern towns into cities, demanding water works and gas works, keeps the cast pipe trade lively. These works pay about $15 per ton for the pig iron used. The Birmingham Rolling Mill, one of the most complete plants of the kind in the country, is running full. The product is bar, fish-plate, angle-iron, light rail, sheet and plate irons. The daily output is 45 tons. The managers will not sign the scale as demanded by the union men employed. They have plenty of non-union men to run the works, and will not stop, no matter what the union men may do or try to do.

The combination of De Bardeleben and the Phillips-Beettorff Co., of Nashville, will build a blast furnace and stone mantel and grate foundry near Birmingham. The capital will be $250,000, half furnished by each party. The capacity of the foundry will be about 40 or 50 tons daily, half at Birmingham, half at Nashville. The iron will be charged to the foundry at $12.50 per ton, about what the combination expects will be the net cost of producing it. This is the whole story of the great sale of foundry iron at this low rate—only this and nothing more.

The position of the Southern railroads in the present emergency of low prices and dull trade is most commendable. Some of the lines in the Southern pool are now hauling pig iron at 0.56 cent per ton per mile, at which they are, of course, losing money. The managers make no distinction between furnaces located on single lines or at the termini of several. These are better rates than Northern lines generally give, and they enable Southern stacks to keep going.

The general outlook for iron production in the section, as to quality, is better than the immediate prospect of prices. The coke stacks of Tennessee and Alabama within the next 18 months will have a capacity of fully 500,000 tons annually. La Grange Furnace, on the Tennessee River, in West Tennessee, has been fully rebuilt and will blow in on June 15. The plant has a very high reputation for fine foundry irons, and in its renewed condition will make about 45 to 50 tons of hot-blast charcoal pig of the best brand. The stack will be blown by two new engines fitted with two batteries of boilers and Allimer charger.

Many points not at all developed in the South are quite as favorably located for making iron cheaply as Chattanooga or Birmingham. The advantage these cities enjoy is in the fact that their districts have passed the experimental stage. It costs great sums of money to build up a trade centre, test raw material and get rid of incompetent management. Alabama iron works have only failed when they have fallen into the hands of enthusiastic amateurs. The practical men in that section repudiate all estimates of the cost of iron production below $12.50 per ton, though some of them have been slow to contradict stories of phenomenal cheap production, regarding them as valuable advertisements to attract investors.—*Iron Age.*

Fast Time.

Last Friday a special train carrying 250 boys from the St. Paul's school in Concord, N. H., was run over the New York, New Haven & Hartford road, from Springfield to New Haven, in remarkably quick time. The train left Springfield just ahead of the noon express, at 11:45 o'clock, and reached New Haven at 1:14 p. m., making the whole distance, 63 miles, in 1 hour and 29 minutes. Considering that the train was slowed at the Enfield bridge, the tunnel and all stations, the run is considered an exceptionally good one. The locomotive drawing the train was the "Mercury," which was built by E. M. Reed some years ago.—*Boston Traveller, June 23.*

The New Bridge Over the Ohio.

A reporter of the Louisville *Courier-Journal* asked Col. Bennett H. Young how work was progressing on the new Sand Island bridge there, and he replied that it was progressing satisfactorily. "There are now about 400 men at work in various ways, and river pier No. 2 has been completed. It is 105 ft. high, and is, I think, the most beautiful piece of masonry work on the Ohio River. Work on the coffer dam was commenced this week, but the sudden rise in the river Wednesday night threw us out a little, and delayed this particular work some. We will begin on it Monday and push right through."

"What are the dimensions of the various piers and the courses?" was asked.

"The first three courses of all the piers are 3 ft. in width, composed of magnificent stone, some of which weigh as much as 18,000 pounds. The upper courses are all 2 ft. in width. The large pivot pier, which contains nearly one-third of the entire machinery, is now secured, and the contractors are laying the foundation. It will be completed in about 45 days. This pier is about 30 ft. through, will stand 107 ft. in height, and upon it rests the draw which is upon the Indiana side."

"When will work upon the superstructure be commenced?"

"Work on the masonry and superstructure will be prosecuted at the same time. In July the Delaware Bridge Co. will begin construction of the bridge itself. This will be built at Trenton, N. J., and will be brought up to the highest perfection possible to engineering science. It will be composed mostly of steel, and, so far as I know, will be the only steel bridge across the Ohio."

"How long will it take to complete the superstructure after the substructure is finished, making allowance, of course, for the high water in the early spring?"

"The contractors are required by their agreement to complete the superstructure within 90 days after the substructure is done. The draw and two Indiana spans will be completed this year. The people of Louisville will have a rare opportunity of seeing what engineering skill has accomplished when this work is in progress. In the erection of this bridge no false work will be used except in the land span, thus obviating the delay that usually occurs from high water. The first river span will be the one over Sand Island, 360 ft. in length. After this span has been completed the two adjoining spans will be balanced or anchored upon it and built out into mid-air 180 ft., the theory being that a span 360 ft. will maintain 180 ft. in the next spans on either side. On the Kentucky shore 180 ft. will be built out from the shore pier. There will be 180 ft. from the Kentucky shore and 180 ft. from the island span hanging in the air apparently unsupported, but of course sustained by the anchor on the Kentucky shore and the island span. Across the space of 120 ft. intervening between the two pieces before mentioned, a wooden truss bridge will be erected, and on this the remaining steel will be placed in position. The span is then complete, and the work accomplished without false work, and without any impediment to navigation. This plan will be pursued in the balance of the work. This bridge is remarkable in having two channel spans, one on the Kentucky side 483 ft., and one over the Indiana channel 480 ft."

"What will be the width of the bridge, and what facilities will it afford?"

"It will be over 50 ft. wide, will have a double wagon way and sidewalk, double street car and single railway tracks, and will be as fine a piece of work as there is in the country."

"Who are the engineers in charge of the work, and what do they say as to when it will be completed?"

"The engineers are Chas. Macdonald, of the Delaware Bridge Co., and Edward Hemberle, of Chicago. We hope to get the bridge done early in 1885."

The Block System in England.

About 94 per cent. of the double mileage of the railways in England and Wales is now worked on the absolute block system, and the greater portion of the single lines is under the same control, in addition to the train-staff system. In Scotland the double mileage worked by the absolute block is 90 per cent. of the whole, and in Ireland 22 per cent.—*Engineer.*

THE SCRAP HEAP.

He was Watching the Train.

As the Atlanta train was pulling out from Trade street depot last Monday a negro man was seen standing on a side track in the yard intently watching the moving cars. Behind the colored man the shifting engine was seen coming, and before the spectators could realize it, there was a collision between engine and darky. The latter was knocked across four or five tracks, clearing a flat car in his transit, and after plowing a furrow through a section of the yard with his head, finally drew up against a pile of brick, which succeeded in stopping him. To the relief of all, the darky, instead of lying motionless, quickly jumped up and commenced brushing the dirt from his clothes. The only damage sustained by him was the loss of three teeth and a broken finger. The next time he watches a train he will sit on a fence and see it go by.—*Charlotte (N. C.) Observer.*

Catching a Crane.

Saturday night, about four miles east of Lynchburg, on the Richmond & Alleghany road, a large crane flew in front of the engine of a western-bound train and was killed after breaking the glass in the head-light and the flag-staff. It was brought to Lynchburg by the engineer and found to measure 5 ft. 4 in. in length.

It Would Not Pay.

Apropos of the opening of the Nantucket Railroad to Siconset, a bit of Star route scandal has been unearthed here relative to the carrying of the United States mails. The distance is about eight miles, and the railroad corporation at an early hour put in its bid to the Government, but was beaten. A certain party with a donkey and cart outbid the railroad, and obtained the contract. What did the man with the donkey then do but turn about and offer to divide the compensation with the railroad company in consideration of a free pass over the road! To his credit, let it be said, Superintendent Folger promptly declined the proposition, not only on the ground of political corruption, but because it would not pay sufficient rate of compensation to the road. —*Boston Traveller.*

The Lake Shore's Wood Piles.

It sounds strangely that the Mexican Central road is about to use coal instead of wood for fuel for all its locomotives, but the time was, not many years ago, when all the roads entering Cleveland used wood almost exclusively. The Lake Shore wood trains used to be a feature of the road, and the steam saw was sent from station to station to reduce huge piles of wood to suitable size for use. Many of the minor employés of the road came to consider the company's wood pile one of the perquisites of their positions, and it was not until 1871 or 1872 that the company sought to correct this impression. One noted instance is told of an Irish settlement around the station at Painesville, many of whose members owned considerable property largely through this channel. By night the company's wood was transferred into their back yards and by day the thrifty housewives used to carry on an extensive laundry business. One family, after raising and educating twelve sons and daughters, and starting them out in life, also became the owners of a house and lot of some value. So hardened had they become to taking the wood that at last the company determined to make an example of them. The man was placed under arrest, and at his trial a clear case was proven against him, and he was fined $10, much to his amazement, but after leaving the court he began to reckon the thing up, and as a result of his cogitation he remarked to a sympathizing friend, who stood by: "Ten dollars for thirteen years of wood is not so high, after all, be jabers."—*Cleveland Leader.*

A Thoughtful Agent.

Stranger.—"Ticket to Montreal, Canada, please."

Ticket Agent (whispering).—"Here it is; lay low."

Stranger.—"What?"

Ticket Agent.—"There is a detective right behind you."

Stranger.—"What do I care for detectives? I came here from Montreal on business and I am merely returning home."

Ticket Agent.—"Beg pardon; thought you were an American."—*Philadelphia Call.*

Hunting in the Waiting Room.

At about half-past 1 o'clock this morning information came to Station 4 that a leopard was concealed in the ladies' room of the Boston & Albany depot. Sergeant Blanchford and a posse of men were sent to capture the animal, and as soon as they reached his hiding-place the officers opened fire. The leopard was not hurt although the surrounding seats were badly riddled. Word was sent to Dr. Al. Watts, and on that gentleman's arrival the animal, which was found belonged to the doctor's menagerie, was secured. While taking him out of the depot the leopard managed to get away from his capturer, but was in a few minutes lassooed and in a short time returned to his quarters. Examination of the animal's cage showed that he had gnawed a hole through the top and escaped by jumping from a second-story window. —*Boston Traveller, June 23.*

Not Flattered by Attention.

A west-bound freight on the B. & M. main line yesterday reported at Dorchester that there was a man lying doubled up near the track some distance back, who looked as if he might have been hurled off a train and killed or made insensible.

The word was sent in and orders were sent that the east-bound passenger should stop and an examination of the matter be made. As they approached the place designated they saw the man, evidently in the same position he was in when seen by the freight train crew. The train stopped and the conductor and the engineer and the fireman and most of the passengers got off in a great excitement and gathered around the prostrate form.

"See how he is doubled up," said one of the passengers. "Poor fellow, that must be just the way he fell."

"Doesn't seem to be bloody," said another.

"Look, he moves," said a third, as they came up closer. "He isn't dead, anyway. Seems to be breathing all right."

"I don't believe he is much hurt," said a little man from Kansas. "Here, what's the matter? Can you hear?"

The figure raised up, and wiping his eyes with a pair of grimy fists, said: "It beats h—l if a man can't lay down and take a nap without having an excursion run out to gape at him."—*Lincoln (Neb.) State Journal.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Vicksburg & Meridian, adjourned annual meeting, at the office in New York, July 16, at noon.

Dividends.

Dividends have been declared as follows:

Chicago, Iowa & Nebraska (leased to Chicago & Northwestern), 5 per cent., payable July 1, to stockholders of record on June 10.

Chicago, Rock Island & Pacific, 1¾ per cent. quarterly, payable Aug. 1. Transfer books close June 28.

Concord & Portsmouth (leased to Concord Co.), 3½ per cent., semi-annual, payable June 27.

Flint & Pere Marquette, 3½ per cent., semi-annual, on the preferred stock, payable July 15, to stockholders of record on June 25.

Housatonic, 2 per cent., quarterly, on the preferred stock, payable July 15. Transfer books close July 4.

Lake Shore & Michigan Southern, 1½ per cent., quarterly, payable Aug. 1. Transfer books close June 30. This company drops from 2 to 1½ per cent.

Norwich & Worcester, 5 per cent., semi-annual, payable July 10, to stockholders of record on June 30.

St. Paul & Northern Pacific (leased to Northern Pacific), 3 per cent., semi-annual, payable July 15. Transfer books close June 30.

Southwestern, of Georgia (leased to Central, of Georgia), 3½ per cent., semi-annual, payable June 24.

Vermont Valley, 3 per cent., semi-annual, payable July 1, to stockholders of record on June 20.

Worcester, Nashua & Rochester, 1½ per cent., semi-annual, payable July 1, to stockholders of record on June 25.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

General Baggage Agents' Association, semi-annual meeting, in Boston, on Wednesday, July 16.

Traveling Passenger Agents' Association, annual meeting, in Denver, Col., on Tuesday, Aug. 12.

Western Association of General Passenger & Ticket Agents, adjourned meeting, in Minneapolis, Minn., on Wednesday, Aug. 13.

Train Dispatchers' Association, preliminary meeting, to form an association, in Louisville, Ky., on Wednesday, Aug. 20.

Master Car Painters' Association, annual convention, in Boston, on Wednesday, Sept. 3.

Road-Masters' Association of America, annual convention, in Indianapolis, Ind., on Wednesday, Sept. 10.

Association of American Railroad Superintendents, semi-annual meeting, in Boston, on Tuesday, Sept. 16.

National Association of General Passenger & Ticket Agents, semi-annual convention, in Boston, on Tuesday, Sept. 16.

New England Railroad Club, first monthly meeting for the season, at the rooms in the Boston & Albany station in Boston, on Wednesday, Sept. 24.

New England Road-Masters' Association, annual convention, at White River Junction, Vt., on Wednesday, Oct. 8.

General Time Convention, fall meeting, at the Continental Hotel, Philadelphia, on Thursday, Oct. 9.

Southern Time Convention, fall meeting, at No. 46 Bond street, New York, on Wednesday, Oct. 15.

American Street Railway Association, annual convention, in New York, on Wednesday, Oct. 15.

Western Society of Engineers.

The 188th meeting was held at the Society rooms in Chicago, on Tuesday, June 17, 1884. Vice-President Randolph in the chair.

The Secretary read a letter from the American Institute of Mining Engineers, expressing the thanks of that Society for courtesies received during its recent meeting in Chicago.

The Secretary also announced the receipt of a photograph likeness from Mr. Lyman Bridges.

It was voted that at the next meeting the Committee on Order of Proceedings provide a lunch for that occasion.

Mr. Bates read a paper on "The Duty Test of a Cast-Iron Boiler." It was voted that this paper should be printed.

Mr. Randolph exhibited the plans and drawings for the new union passenger house of the Western Indiana Railroad Co., on Polk street, in Chicago.

New York, Pennsylvania & Ohio Insurance Association.

At the annual meeting of the New York, Pennsylvania & Ohio Insurance Association, composed of employés of the New York, Pennsylvania & Ohio road, held in Jamestown, N. Y., June 17, there were present about 500 members. The business meeting was held in the morning, when the Secretary's report showed that during the year the membership had increased from 608 to 1,032. The Association was reported in a prosperous condition. The usual routine business was transacted and it was resolved to hold the next annual meeting in Cleveland. After the conclusion of the meeting the members and their families enjoyed an excursion around Lake Chatauqua on the steamer "Jamestown" by the invitation of the Chatauqua Steamboat Co., its owner.

ELECTIONS AND APPOINTMENTS.

Anniston & Chattanooga.—Mr. J. C. Vance, of Chattanooga, Tenn., is to be President of this new company, and J. W. James Secretary.

Boston & Lowell.—Mr. C. S. Mellen has been appointed Superintendent of the entire line, including all the lines latterly leased in New Hampshire. His office will remain in Boston.

Mr. James A. Taylor is made Superintendent of Motive Power of the entire line, and his office is removed from Boston to Concord, N. H.

Mr. George E. Todd is appointed Superintendent of the New Hampshire Division, with office in Concord. He was recently Superintendent of the Northern Railroad.

Burlington & Northwestern.—This company has elected T. W. Barbydt, President; John S. Cameron, Vice-President; R. M. Green, Secretary and Treasurer. Mr. Henry L. Rich is appointed Chief Clerk of the General Freight and Passenger Department, and will have charge of the detail workings of the department.

Central Iowa.—The new board has elected officers as follows: President, Alfred Sully; Vice-President, Russell Sage; Secretary and Transfer Agent, George T. M. Davis; Executive Committee, W. C. Hurd, Russell Sage, Alfred Sully, G. D. Taintor.

Cleveland, Delphos & St. Louis.—Mr. W. Semple, of Pittsburgh, has been appointed Receiver of this road. He is also President of the company.

Columbus, Fort Wayne & Western.—The directors of this new Indiana company are: B. F. Martz, John W. Ogden, A. A Purman, P. A. Randall, O. A. Simons, Thomas R. Sharp, E. C. Winstanley.

Danville, Olney & Ohio River.—Mr. P. A. Marsh is appointed Train-master with office at Indianapolis. He will have charge of all station agents and trainmen.

Detroit, Mackinac & Marquette.—The following circular from General Superintendent D. McCool is dated Marquette, Mich., June 5:

"On June 9 the Marquette & Western Railroad will be opened for freight traffic, and soon thereafter for passenger traffic, between Marquette and Ishpeming, and will connect with nearly every iron mine in the vicinity of Ishpeming and Negaunee. The road will be operated in connection with the Detroit, Mackinac & Marquette Railroad, so as to form practically one line from Point St. Ignace to Ishpeming. The following officers of the Detroit, Mackinac & Marquette Railroad will also represent the Marquette & Western Railroad: D. McCool, General Superintendent; F. Milligan, General Freight and Passenger Agent; E. W. Allen, Auditor and Receiving Cashier; J. B. Wilson, Mechanical Superintendent; C. H. Watson, Roadmaster.

"The following appointments have been made to take effect this date on both roads: W. J. Teuch, Purchasing Agent and Traveling Passenger and Freight Agent; S. B. Floeter, Train-Master; F. Bechely, Train Dispatcher. A. A. Farmer is appointed agent at Ishpeming, and A. E. Delf agent at Negaunee."

Evansville & Indianapolis.—The directors of this company (successor to the Indianapolis & Evansville) are: S. M. Archer, D. J. Mackey, W. D. Ewing, Wm. Heilman, E. P. Huston, E. B. Morgan, Edwin Taylor. Office in Evansville, Indiana.

Evansville, Terre Haute & Chicago.—This company has elected the following directors: H. W. Beckwith, E. M. Benson, Josephus Collett, S. S. Collett, R. J. Gessie, W. R. McKeen, C. Matthews, R. D. Moffatt. The road is leased to the Chicago & Eastern Illinois.

Georgia Midland & Gulf.—Mr. J. D. Trammel is Chief Engineer of this new road. His headquarters are at Hamilton, Ga., for the present.

Louisville, New Orleans & Texas.—Mr. J. C. Hutchins has been appointed Supervisor of road for the Southern Division of this road, extending from Vicksburg, Miss., southward. He was recently a contractor on the Vicksburg, Shreveport & Pacific road.

Master Mechanics' Association.—At the annual convention in Long Branch, last week, the following officers were elected: President, J. H. Flynn, Western & Atlantic; First Vice-President, J. D. Barnett, Midland, of Canada; Second Vice-President, Wm. Woodcock, Central Division, Philadelphia & Reading; Secretary, J. H. Setchel, Ohio & Mississippi; Treasurer, George Richards, Boston & Providence. Mr. Setchel enters upon his fifteenth year as Secretary.

Milwaukee, Lake Shore & Western.—The board has elected F. W. Rhinelander, President; J. R. Bush, Vice-President; A. S. Cary, Secretary; Gordon Norrie, Treasurer. The only change is the election of Mr. Bush as Vice-President in place of Wm. H. Guion.

Missouri Pacific.—Mr. J. B. Heitchew has been appointed Assistant Superintendent of bridges and buildings in place of J. R. Mitchell, resigned.

New York, Pennsylvania & Ohio Insurance Association.—At the annual convention last week the following officers were elected: President, John B. Shaw, Jamestown, N. Y.; Vice-President, J. M. Booth, Cleveland, O.; Secretary and Treasurer, George B. Hinds, Kent, O.

Ogdensburg & Lake Champlain.—At the annual meeting in Ogdensburg, last week, the following directors were chosen: Wm. J. Averill, D. W. Lawrence, Ogdensburg, N. Y.; Timothy Hoyle, Champlain, N. Y.; J. W. Hobart, J. Gregory Smith, E. C. Smith, F. S. Stranahan, St. Albans, Vt.; James R. Langdon, Montpelier, Vt.; B. B. Smalley, Burlington, Vt; Samuel A. Carlton, Wm. A. Haskell, Lansing Millis, Sterne Morse, Boston.

The new directors are Messrs. Hoyle, Hobart, J. G. Smith, E. C. Smith, Stranahan, Langdon, Smalley and Millis, all Central Vermont men, who replace W. L. Frost, F. M. Holmes, J. Thomas Vose, Emmons Raymond, Peter Butler, W. R. Blodgett, John S. Farlow and Horace Fairbanks.

Oregon Improvement Co.—The new board has elected Elijah Smith President.

Oregon Railway & Navigation Co.—The new board has elected officers as follows: T. Jefferson Coolidge, President; Geo. O. Manchester and C. H. Prescott, Vice-Presidents; Frederic R. Nourse, Treasurer; C. J. Smith, Comptroller; Theodore Wygant, Secretary; Alfred Rodman, Assistant Secretary. The only change is the choice of Mr. Manchester for Vice-President. He is not a director, but is eligible to his present position through an amendment of the by-laws at the last annual meeting.

Oregon & Transcontinental Co.—The new board met in Portland, Oregon, June 24, and elected the following officers: President, Elijah Smith; Vice-President, Charles Prescott; Secretary, Joseph Simon; Assistant Secretary and Assistant Treasurer, Edward Edes. No Second Vice-President, Treasurer or Controller was elected.

Richmond & Chesapeake.—This company has been organized in Richmond, Va., with the following officers: C. E. Belvin, President *pro tem.*; T. C. Leake, Jr., J. B. Pace, H. N. Price, S. G. Tinsley, directors; S. G. Tinsley, Secretary and Treasurer; H. A. Atkinson, Attorney; A. L. Johnston, Chief Engineer.

Rochester & Ontario Belt.—Mr. George H. Merchant, of Rochester, N. Y., is appointed Receiver of this road.

St. Paul & Duluth.—Mr. J. H. Fisher has been appointed General Superintendent to succeed Mr. H. P. Breed, resigned.

Texas & St. Louis.—Mr. J. R. Hastings has been appointed Assistant Superintendent of the Missouri and Arkansas divisions with office at Pine Bluff, Ark. He was formerly on the Peoria & Pekin Union road.

Vermont Valley.—At the annual meeting in Brattleboro, Vt., June 18, the following directors were chosen: Frederick Billings, Oscar Edwards, A. B. Harris, Hugh Henry, John B. Page, Henry C. Robinson, James H. Williams. The board elected A. B. Harris President.

PERSONAL.

—Mr. Frank Bartlett, formerly division engineer on the Denver & Rio Grande road, has resigned and has accepted a position on the Canadian Pacific road.

—Mr. H. P. Breed, General Superintendent of the St. Paul & Duluth road, has tendered his resignation, to take effect as soon as his successor is appointed.

—Mr. C. L. Cornwall, formerly Engineer on the Louisville & Nashville's Knoxville Branch extension, has been appointed Assistant Superintendent of the Louisville & Portland Canal.

—Col. T. M. R. Talcott, late General Manager of the Richmond & Danville road, while driving in his own carriage near his Summer residence at Bonair, Va., was thrown out and seriously hurt.

—Mr. Samuel Hunt has resigned his position as Master of Transportation of the East Tennessee, Virginia & Georgia road. He has been on that road a year, and was previously on the Cincinnati Southern.

—Mr. W. J. Palmer, who resigned the presidency of the Denver & Rio Grande Co. several months ago, has now also resigned his position as a director. The reason given by him for this action is that he unwilling to appear responsible for the present management of the company in any way.

—Mr. Cesar A. Rodney, Vice-President of the Vulcanized Fibre Co., shot and killed himself, at his residence in Wilmington, Del., June 23, while laboring under a temporary aberration of mind. Mr. Rodney had been much excited for some days, and had said that he was ruined or much embarrassed financially, although his affairs were in unusually sound condition.

—The firm of M. Morgan's Sons, bankers, in New York, suspended payment June 24. The firm has always stood high, and it is still believed that their assets considerably exceed their liabilities. Their present embarrassment is understood to proceed from large investments in Denver & Rio Grande and Mexican National. Mr. H. Morgan of this firm has been for a number of years Treasurer of the New York, Providence & Boston Company.

—Mr. Moses Lyman retires from the position of Treasurer and Superintendent of the Cayuta Wheel & Foundry Co. at Waverly, N. Y., on July 1. Mr. Lyman built the Cayuta Works in 1872 for a company composed chiefly of the makers of Salisbury and Richmond pig iron, and under his charge an extensive and prosperous business has grown up. He has been Treasurer of the company from its first organization, and for four years past has been Superintendent also.

—A dispatch from Savannah, Ga., June 16, says: "A meeting of the Wadley Memorial Association was held here yesterday. The association closed a contract with an eminent sculptor, Mr. Robert Cushing, of New York, for a life-size bronze statue of the late Wm. M. Wadley. By a vote of the employés of the Central road contributing the funds for the memorial, it was decided to locate the monument in Macon. The statue will cost $11,500 and will be completed by Jan. 1 next."

—Mr. Chauncey F. McCulloh, a well-known electrician, died at his residence in Baltimore, June 21, after a lingering illness from consumption, aged about 39 years. Mr McCulloh was for many years a clerk in the employ of the Baltimore & Ohio Railroad Co., and rose to the position of chief clerk in the office of the Master of Transportation. In the darkest hours of the District Telegraph Co., Mr. McCulloh became its Manager, and in a short time brought it up to a high state of efficiency. When the Baltimore & Ohio Telegraph Co. was organized he accepted a responsible and lucrative position there. He subsequently became connected with the Maryland Telephone Co., where he remained until ill health compelled him to give up all active employment. Mr. McCulloh leaves a wife and two children.

—Commodore Cornelius K. Garrison, well known for his many years connection with transportation lines, both steamboat and railroad, made an assignment on June 20 to Mr. John T. Terry. Commodore Garrison has generally been believed to be a very wealthy man and much surprise has been expressed at this action. His embarrassment has resulted from large investments in unprofitable roads, of which the Wheeling & Lake Erie is the principal. This road is almost entirely owned by Mr. Garrison, and a number of notes issued by him on its account have recently been protested. How much of his money has been locked up in this and other roads is unknown, although the general belief is that his property will prove to be considerably more than his debts when his estate can be settled up. Commodore Garrison is now nearly 80 years old, and one motive for his assignment is understood to be the fact that at his present age and his present physical condition he is unable to continue the management of his complicated affairs.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1884.	1883.	Inc. or Dec.	P.c.
Five months ending May 31:				
Des M. & Ft. D..	$132,265	$113,738	I. $18,527	16.2
Eastern.....	1,307,142	1,337,029	D. 29,887	2.2
Ft. Worth & D..	185,400	139,600	I. 45 800	32.7
Nash., C. & St. L.	983,224	931,329	I. 51,895	5 6
Net earnings..	413,989	394,423	I. 19,546	4.9
Northern Cent..	2,203,620	2,468,450	D. 264,830	10.7
Net earnings..	811,714	899,310	D. 87,596	9.7
Pennsylvania	19,427,080	20,195,713	D. 768,633	3.8
Net earnings..	7,029,020	7,339,488	D. 310.468	4 2
Rome, W. & Og.	609,083	593.510	I. 15,573	2.6
Net earnings..	164,296	*6,202	.....	....
Utah Central....	388,434	494,650	D. 106,216	21.4
Four months ending April 30:				
Flint & Pere M..	$812,799	$826,016	D. $13,217	1.6
Net earnings..	276,053	274,242	I. 2,411	0.9
Minn. & St. L	532,877	496,026	I. 36,851	7.4
N. Y., Pa. & O...	1,772,383	1,866,556	D. 94,173	5.0
Month of April:				
Minn. & St. L ...	$158,940	$135,868	I. $23,072	17.0
N. Y., Pa. & Ohio.	484,864	458,022	I. 26,842	5.8
Month of May:				
Des M. & Ft. D..	$24.917	$20,044	I. $4,873	24.4
Eastern.....	275,159	283,345	D. 8,186	2.9
Ft. Worth & D...	64,400	37,700	I. 26.700	73.5
Nash., C. & St. L.	190,751	171,079	I. 19.672	11.5
Net earnings..	85,319	75.958	I. 19.362	25.5
Northern Cent....	477,838	499,132	D. 21,294	4 2
Net earnings..	194,357	212,076	D. 17,719	8.4
Pennsylvania	4,267.173	4,703,006	D. 35,833	0.8
Net earnings..	1,639,494	1,608,674	I. 30,920	1.9
Rome, W. & Og..	137.356	125,845	I. 11.511	9.1
Net earnings..	41,233	651	I. 40,582	....
Utah Central....	85,260	97,671	D. 12,411	12.7
Second week in June:				
Chi. & East. Ill..	$27.712	$34,855	D. $7,143	20.4
Chi. & W. Mich..	28,983	30.392	D. 1.409	4.7
Ill. Central.....	208,700	247,845	D. 39,145	15.8
Mo. Pacific.....	581,060	563,000	I. 18,000	3.2
Mil. & Northern.	20,920	20,815	I. 105	0.5
Peoria, Dec. & E.	11,826	10,238	I. 1,588	18.0
Roch. & Pitts....	23,413	12,950	I. 10,463	80.5
Wabash, St. L. & Pacific.....	275,000	275,000	.....	....
Third week in June:				
Chi. & Nor'west.	$466,000	$478,100	D. $12,100	2.5
Chi., St. Paul, M. & Omaha ..	108,500	102,500	I. 6,000	5.8
Northern Pacific.	254,920	181,300	I. 73,620	40.6
St. L. & San F..	61,200	53,173	I. 8,027	15.1

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements.

Grain Movement.

For the week ending June 14 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments. Total.	Northwestern shipments. By rail.	Northwestern shipments. P. c. By rail.	Atlantic. receipts.
1877....	2,475,641	2,881,932	776,439	26.9	2,079,976
1878....	2,635,349	2,296,402	548,255	23.8	4,159,732
1879....	4,486,068	5,022,099	2,180,498	43.5	6,492,110
1880....	5,574,703	7,639,449	1,838,864	24.3	8,536,178
1881....	6,731,341	5,436,247	1,864,794	34.3	5,982,553
1882....	3,643,451	3,259,398	1,136,945	34.7	2,450,145
1883....	5,573,451	4,681,490	1,373 814	27.6	3,752,691
1884....	4,762,475	4,016,138	2,706,957	55.1	3,725,739

Thus the receipts of the Northwestern markets for the week this year were much more than in 1882, and with that exception were the smallest since 1879. They were 692,000 bushels less than in the previous week of this year, but with that exception were the largest for 13 weeks.

The shipments of these markets were but little less than last year, much more than in 1882, but less than in any of the three years previous, and slightly less than in the previous week of this year. The rail shipments, however, were

nearly twice as great as last year, and more than in any other year, amounting to 55 per cent. of the whole. The shipments down the Mississippi were 87,560 bushels and 1.8 per cent. of the whole.

The receipts of the Atlantic ports for the week were nearly the same as in the corresponding week of last year, 54 per cent. more than in 1882, but much less than in the corresponding weeks of the four years from 1878 to 1881. They were, however, a little larger than the previous week of this year and were the largest since October last. The receipts at Philadelphia, though only 9.4 per cent. of the whole, were the largest since March, and with one exception the largest of the year.

Exports from Atlantic ports for the week to June 14 have been:

	1880.	1881.	1882.	1883.	1884.
Flour, bbls..	122,158	119,778	87,339	154,977	155,365
Grain, bus...6,392,176		4,267,704	969,261	2,274,117	2,241,214

The exports this year were nearly the same as last year, twice as great as in 1882, but 40 per cent. less than in 1881 and 60 per cent. less than in 1880.

Chicago-Ohio River Pool.

The following circular has just been issued by Commissioner Richardson of the Chicago-Ohio River pool:

"Owing to the liability for conflictions of authority and misunderstandings regarding special rates between points in the pool, it is necessary that a general understanding be had as to the proper methods for making of rates. To this end it is agreed that local rate committees be established, consisting of representatives of the passenger departments of roads in interest and located at Chicago, Indianapolis, Louisville and Cincinnati.

"The rights and prerogatives of these committees shall be to consider and act upon all applications or requests for the making of special rates varying from printed schedule, from their respective points to any and all points in the pool.

"Their action shall be final, but must be unanimous before any variation from tariff can be made, and any rates or arrangements agreed to by them, affecting the passenger revenue of this pool, must be reported in writing to the commissioner, and by him promulgated before it shall go into effect.

"The committees shall be composed of representatives of the roads in this pool, as designated by their General Passenger and Ticket Agents:

"At Chicago—C., St. L. & P. Railroad, F. Van Dusen, Assistant General Passenger Agent; C., I., St. L. & C. Railway, J. C. Tucker, General Northwestern Passenger Agent; L., N. A. & C. Railway, E. O. McCormack, Northern Agent; C. & E. I. Railroad, William Hill, General Passenger and Ticket Agent.

"At Indianapolis—J., M. & I Railroad, H. R. Dering, Assistant General Passenger Agent; C., St. L. & P. Railroad, H. R. Dering, Assistant General Passenger Agent; L., B. & W. Railroad, H. M. Bronson, General Ticket Agent; C., I., St. L. & C. Railway, John H. Martin, District Passenger Agent; L., N. A. & C. Railway, Robert Emmet, District Passenger Agent.

"At Cincinnati—C., I., St. L. & C. Railway, John Egan, General Passenger and Ticket Agent; C., St. L. & P. Railroad, F. Van Dusen, Assistant General Passenger Agent; C., H. & D. Railroad, Samuel Stevenson, General Ticket Agent; L., B. & W. Railway, H. M. Bronson, General Ticket Agent.

"At Louisville—J., M. & I. Railroad, H. R. Dering, Assistant General Passenger Agent; L., N. A. & C. Railway, W. R. Baldwin, Chief Clerk Passenger Department; O. & M. Railway, R. S. Brown, Southern Passenger Agent.

"These local rate committees shall meet at specified times and place, to be designated by them, and oftener at the request of any member of such committee. Any request for reduction or changes in established rates must be referred to such respective committee, and the jurisdiction of one committee must not be encroached upon by other committees without consent."

Cotton.

Cotton movement for the week ending June 20 is reported as follows, in bales:

Interior markets:	1884.	1883.	Inc. or Dec.	P. c.
Receipts.....	2,608	8,543	D. 5,875	69.1
Shipments.....	7,089	19,076	D. 11,987	63.1
Stock, June 20	45,934	88,240	D. 42,306	48.1
Seaports:				
Receipts.....	4,725	12,395	D. 7,670	61.8
Exports.....	54,237	37,026	I. 17,211	46.5
Stock, June 20.....	361,999	401,626	D. 39,627	9.8

The total cotton in sight, or actual shipments from plantations, for the cotton year (from Sept. 1), to June 20, is estimated at 5,616,258 bales; the decrease, as compared with last year, is 1,264,365 bales, the increase as compared with 1881–82 is 323,314 bales, and the decrease from 1880–81 is 770,934 bales.

The Harvest in New South Wales.

The total number of bushels of wheat grown in New South Wales in 1883–84 is 15,449,143, against 8,735,440 for 1883, the increase being no less than 6,783,703 bushels. The whole yield is far in advance of that of any previous year, the nearest approach to it being in 1881, which was 5,771,674 bushels behind the present year's yield. The average for wheat is 14.09 bushels per acre, the highest for the previous nine years being in 1876, when it was 15.49 bushels. The increase in oats, as compared with previous years, was 289,271 bushels; in barley, 301,689 bushels; in peas and beans, 103,621 bushels; in potatoes, 31,519 tons; in hay, 106,807 tons; in grass and clover seeds, 12,872 cwt.; in hops, 6,526 cwt.; in tobacco, 4,261 cwt. The average of oats was 25.12, as against 26.17; the average return of potatoes per acre was 4.01 tons, as against 3 78 tons, and of hay, 1.43 tons, as against 1.06.—*Engineer.*

Coal.

Coal tonnages for the week ending June 14 are reported as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Anthracite.....852,143		770,988	I. 81,155	10.5
Eastern bituminous....193,565		169,133	I. 24,432	14.4
Coke 62,265		58,726	I. 3,539	6.0

As usual after a week of stoppage, the anthracite shipments last week were very heavy. It is understood that the anthracite companies have agreed for July upon a repetition of the June arrangement, that is a complete suspension of mining in the first and third weeks of the month, and a nominal increase in prices.

The *Engineering and Mining Journal* says: "One by one the anthracite coal railroads are reaching out for a share of the tonnage of the bituminous coal-fields of Pennsylvania. The Philadelphia & Reading will get its share of the fruit of the effort of the Vanderbilt lines to develop the Southwestern system, and now the most prosperous of the anthracite roads has completed arrangements that will secure to it a heavy tonnage of what is conceded to rank among the best paying freight. It has been announced during the week that the Lehigh Valley Railroad has secured control of a large tract, about 47,500 acres, of coal lands in the Snow Shoe District, which we have spoken of repeatedly in the past as one of much promise. The railroad company has, for a consideration of $1,000,000, purchased the property of the Snow Shoe Land & Improvement Co. and of the Snow Shoe Coal Co., in which Messrs. Berwind, White & Co., the pioneers and heaviest producers in the district, were largely interested. The function of the railroad company, it appears, will remain that of a carrier, since we understand that the lands have been leased to leading operators, who will actively push work, so that it is believed that at no distant day the output of the region will reach 1,000,000 tons of coal. The Snow Shoe coal has always sought the markets of Northern New York and Buffalo, not being as advantageously situated in reference to tidewater markets as its older neighbor, the Clearfield District. Until now, the coal has been shipped by the Tyrone Division of the Pennsylvania Railroad. By a traffic agreement with that company, the coal will be hauled 140 miles over its road from Snow Shoe Intersection over the Bald Eagle Valley Branch to Lockhaven, thence over the Philadelphia & Erie Division to Sunbury, and from that point over the Sunbury, Hazleton & Wilkes-Barre Branch to Tombicken or Mount Carmel on the Lehigh Valley Railroad, to be marketed on the line of the latter, with Buffalo as the final objective point. To the manufacturing industries along its line, large in the aggregate, this new source of supply will be one of no small importance. The many anthracite blast-furnaces within reach of the line will be able to obtain some Snow Shoe coke, which has already been tested with satisfactory results by some furnace-men, who are yielding to the tendency of the day to employ growing quantities of coke as a part of the fuel charge. The Buffalo market, already so hotly contested for by the Erie and the Rochester & Pittsburgh railroads, will see a new and powerful competitor appear in the field. The movement is one in harmony with the general tendency developed of late to put within the reach of a growing area of country hitherto largely commanded by anthracite a good bituminous coal suitable for manufacturing purposes, thus narrowing down the more precious fuel to its true domain, that of domestic consumption."

The coal tonnage of the Pennsylvania Railroad for the week ending June 14 was:

	Coal.	Coke.	Total.
Line of road.....	144,446	55,022	199,468
From other lines.....	60,277	7,243	67,520
Total..... ...	204,723	62,265	266,988

The total tonnage this year to June 14 was 5,910,059 tons, against 5,402,476 tons to the corresponding date in 1883; an increase of 507,583 tons, or 9 4 per cent.

Cumberland coal shipments for the week ending June 21 were 64,152 tons. The total shipments this year to June 21 were 1,230,910 tons, against 1,047,807 tons to the corresponding date last year, an increase of 183,103 tons, or 17.5 per cent.

Passenger Traffic Notes.

A circular from General Passenger Agent Ford notifies connecting lines that tickets reading over the Indianapolis & St. Louis road from St. Louis to Indianapolis, and thence eastward to points on or over the Chicago, St. Louis & Pittsburgh will not be honored for passage on the Chicago, St. Louis & Pittsburgh after July 1. Similarly tickets reading over the Indianapolis & St. Louis and the Bee Line to Crestline and thence by the Pittsburgh, Fort Wayne & Chicago to points eastward will not be honored on the Fort Wayne road.

Another circular from General Passenger Agent Smith, of the Cleveland, Columbus, Cincinnati & St. Louis, notifies connecting lines that conductors on that road will not be allowed to receive for passage tickets from St. Louis or points west or south reading from St. Louis to Indianapolis over the Vandalia Line. Tickets reading over the Bee Line to Indianapolis and thence westward over the Vandalia Line will also be refused after July 1.

Shipping American Cattle Through Canada.

The Canadian Pacific Co. has applied to the Canadian government for permission to carry American cattle through Canada in bond. On this the Montreal papers base expectations of extensive exports of Montana cattle by way of that port. While a few shipments may be made by this route, it does not appear probable that any very large business will be built up. The greater part of the cattle in Montana are south of the Northern Pacific road, and to reach the Canadian Pacific stations a long and difficult drive is necessary.

RAILROAD LAW.

New Jersey Railroad Law.

An amendment to the general railroad law passed by the New Jersey Legislature at its recent session provides "That it shall be lawful for the President and directors of any railroad company to retain the possession and use, either in whole or in part, of any portion of the orig inal railroad for which an improved or straightened line has been substituted, if in their opinion the abandonment of the said portion would be inconvenient or injurious to the interests of the public and of the railroad company; provided, that said portion of said original railroad for which an improved or straightened line has been so substituted, and the use and possession of which either in whole or in part the President and directors of said railroad have determined to retain, shall be liable to be taxed in the same manner and at the same rate of taxation as the real estate of individuals is taxed for municipal, county and state purposes in the same taxing district."

Another amendment provides "That whenever any railroad corporation, heretofore or hereafter organized under and pursuant to the provisions of the act to which this is a supplement, and of the acts amendatory thereof and supplementary thereto, may deem it expedient to abandon a part of their proposed line by reason of having made a connection with another railroad or consolidated with the same, and shall file or cause to be filed in the office of the Secretary of State, in writing and under its corporate seal, and attested by the president and secretary of said corporation, a formal notice of abandonment by said corporation of any part or portion of the route of the proposed railroad of said corporation, theretofore filed in said office of the Secretary of State as required by law, it shall be the duty of the Treasurer of the state upon being notified by said corporation that such part or portion of the route of its said railroad had been so formally abandoned, to repay to said corporation out of the moneys by the said corporation theretofore deposited with the said Treasurer as required by law, a sum equal to the sum of $2,000 for every mile, and a proportionate sum for any distance less than a mile, of its route so abandoned as aforesaid; and said corporation shall not thereafter extend, build or construct its said railroad over and upon the part or portion of the route so abandoned without first filing a new survey and description of the said abandoned portion of its route in the office of the Secretary of State and paying to the Treasurer of this state a sum of money equal to $2,000 for every mile and a proportionate amount for any distance less than a mile, of the route so refiled, said sums to be repaid to said corporation as now provided by law."

OLD AND NEW ROADS.

Anniston & Chattanooga.—A meeting is to be held in Chattanooga, Tenn., June 28, for the purpose of organizing a company to build a railroad from that city by way of Somerville, Ga., and Gadsden, Ala., to Anniston. A considerable amount has already been subscribed for this purpose. The road will pass through a country rich in coal and iron ore, and will reach several new manufacturing towns.

Augusta, Gibson & Sandersville.—The contract for grading this road from Augusta, Ga., to Sandersville, 81 miles, has been awarded to A. J. Twiggs, of Augusta, Ga., who has about 300 men at work and expects to increase his force shortly. The grading on this line is to be finished by November.

Bangor & Piscataquis.—Track on this road is now laid to West Cove on Moosehead Lake, 17 miles beyond the late terminus at Blanchard, Me., and 80 miles from Bangor. The work of ballasting is in progress, and the road will be opened through to the lake July 14. It is expected that a considerable summer travel will follow the opening.

Beach Creek, Clearfield & Southwestern.—Contracts have been let for an extension of the main line of this road from Peale, Pa., to Clearfield Creek and the town of Clearfield. Other contracts will shortly be let for the extension along Clearfield Creek and for a branch up Little Clearfield. Work is now in progress on the Phillipsburg Branch of the road and several shorter branches are also to be built to reach coal deposits within short distances of the road.

Boston & Lowell.—This company has taken formal possession of its leased lines in New Hampshire, the Northern, the Boston, Concord & Montreal and their branch lines. The management of the roads is to be consolidated, the General Superintendent of the Boston & Lowell taking charge of the entire line with division superintendents for the New Hampshire roads. A number of changes are in preparation, but will probably not take effect until July. The Lowell Co. will use to the best advantage the shop acommodations of the New Hampshire lines. It is stated that the main locomotive shops for the entire line will hereafter be at Concord, where the headquarters of the motive-power department will also be placed. The car shops of the Northern Railroad at Concord will be used for the passenger car repair work and new construction for all the lines, while the Boston, Concord & Montreal shops at Lake Village will be used for the freight car work. The construction of new and extensive shops near Boston is thus avoided.

It is stated that an immediate adjustment of the passenger and freight tariffs of the New Hampshire lines will be made resulting in material reduction, especially on lumber, with a view to developing that traffic. Mileage tickets will also be sold, good over all the roads, and other improvements are promised.

It is probable that an extension of the Pemigewasset Valley line will be built, and the Boston, Concord & Montreal will be shortened and improved by the construction of two or three loop or cut-off lines.

It is understood that negotiations are in progress for a permanent business contract with the Concord Railroad, no lease being now considered possible.

Cape Fear & Yadkin Valley.—The completion of this road to Greensboro, N. C., was celebrated June 19, when at the invitation of the business men of Greensboro nearly 5,000 persons from the counties along the line were present, with invited guests from other points as far distant as Wilmington, and were carried over the road from Fayetteville to Greensboro, 130 miles. The road is reported in good condition and the station buildings on the new part of the road are nearly all finished and ready for use. A large force is now employed in laying the track on the extension south of Fayetteville. West of Greensboro some 35 miles of grading are completed and tracklaying will be begun very shortly.

Central Pacific.—A dispatch from San Francisco, June 25, says: "The *Bulletin* this evening publishes the following: 'It is semi-officially announced that the Central Pacific Railway Co. will postpone for a time the payment of salaries due its employés this month in order to accumulate funds to meet more pressing demands in the nature of current expenses. The present cramped condition of the company arises from a falling off in traffic and consequent decrease in profits, caused by disasters, especially to the Southern Pacific and its branches. Timothy Hopkins, the Treasurer of the company, is the only prominent official at present in the city, and he declines to make any statement. General Manager Towne, who is on a visit to Monterey, was telegraphed on the subject, and replied that there was but little foundation in fact for the statement that the company would postpone the payment of the salaries of its employés. It is possible, however, that the pay-car may not be sent out over the entire system until after the 1st proximo. The earnings of the company hold up remarkably well, and the operating expenses of the road compare favorably with those of last year.' Charles Crocker, President of the Southern Pacific and Second Vice-President of the Central Pacific, at present attending the Colton trial at Santa Rosa, on being interviewed, said the *Bulletin* statement was quite true. He had asked the employés for 30 days' credit. He had heard of no grumbling. 'This, he said, 'is the first time such deferment has occurred. We have got some pressing demands to meet and money is so tight that it is harder than drawing teeth to get any. We cannot get more than 25 cents on Southern Pacific bonds I am trying hard to borrow some money and think I shall be able to get it. But all the money bags in the country just now are drawn very tight.' Mr. Crocker, in a telegram to the Associated Press, says: 'The report in the *Bulletin* is substantially true, although we have not yet fully determined the matter. Should the money market ease up we will pay as usual.'"

Chesapeake & Ohio Canal.—In Baltimore, June 24, the trustees for the bondholders filed in the United States Circuit Court, a bill asking for the appointment of a Receiver, the foreclosure of the mortgage, and the sale of the canal. It is thought that the state of Maryland, which is the chief stockholder, will make no opposition to this appointment, but that it will, if anything, assist in the efforts to close up affairs. No interest has been paid on the bonds for a number of years, and for some years past the receipts from the canal have been insufficient to keep it in proper repair, and consequently a great deal of business has been lost, the Cumberland coal companies declining to ship coal on account of the many delays caused by the constant breaks and interruptions to traffic. The canal has been for several years managed more with reference to state politics than to its business, and a change of management is very much desired by those who are interested.

Chicago, St. Louis & Pittsburgh.—The large new shops in Indianapolis are now completed and have been formally transferred by the contractors to the company. A

large force is now at work laying out the yards adjoining the shops and work is being pushed with a view to getting their road for use as soon as possible.

Cincinnati, New Orleans & Texas Pacific.—It is said that the Cincinnati Southern trustees are inclined to look favorably upon the application of this company, lessee of the road, for permission to change the gauge of the road from 5 feet to 4 ft. 8½ in. The object of the original adoption of the 5 ft. gauge for the road was to admit of easy connection with the roads south of Chattanooga, but that reason will be in large part done away with by the fact that if the gauge of the Southern is changed it is intended also to change the gauge of the Alabama Great Southern, the New Orleans & Northeastern, and the other lines controlled by this company, so that the 4 ft. 8½ in. gauge will extend from Cincinnati to New Orleans and Shreveport. Should the change be authorized, two of the three lines running to New Orleans from the North, or rather three of the four, when the new river line is completed, will be 4 ft. 8½ in. gauge, and this action will probably hasten very much the general adoption of the standard gauge throughout the South.

Latest statements are that the change cannot be made without legislative action, as the charters, under which the road was built in Kentucky and Tennessee, specify 5 ft. as the gauge of the road.

Cleveland, Delphos & St. Louis.—On the application of some of the stockholders, the Ohio Court of Common Pleas has appointed Mr. William Semple, of Pittsburgh, Receiver of this road. Mr. Semple is President of the company. The road, which is of 3 ft. gauge, is completed from Delphos, O., to Carey, 56 miles. There are outstanding $560,000 in stock and $560,000 in first-mortgage bonds, nearly all of both stock and bonds being owned in Pittsburgh. The Receiver says that the company is not insolvent, but that the action taken to secure the appointment of a receiver was in order to complete arrangements for the extension of the road, and will prove its condition. Its business, it is said, has been very light.

Columbus, Fort Wayne & Western.—This company filed articles of incorporation in Indiana to build a road from the Ohio line, in Allen County, to the Michigan line, in Laporte County, a distance of about 125 miles. It is an extension of a line already incorporated in Ohio.

Connecticut & Passumpsic Rivers. — The latest report is that negotiations have been completed for a lease of this road to the Connecticut River Railroad Co. The Connecticut River Co. now owns a through line from Springfield to Windsor, Vt., with the exception of a short gap between South Vernon and Brattleboro. The Passumpsic Co. has under its charter the right to build a line from its present southern terminus at White River Junction to Windsor; the distance is only 12 miles and a connecting line could be cheaply and easily built. The report is denied by officers of both companies, who say that there is no foundation for it.

Connotton Valley.—The Boston *Advertiser* of June 23 says: "The amount of Connotton Valley bonds deposited is close upon $4,000,000, and very nearly the amount required for foreclosure. It is essential that $4,000,000 be deposited before June 25, that action may be taken before the court adjourns July 1. If this is not done, there will be some six months' delay in the bondholders acquiring possession of their property."

Dalhousie Branch.—This road has been completed and opened for business. It extends from Dalhousie, N. B., to Dalhousie station on the Intercolonial road, a distance of 6 miles.

Detroit, Grand Haven & Milwaukee.—The Attorney General of Michigan has filed information in the nature of a *quo warranto* in the Michigan Supreme Court with the object of securing a decision on the vexed question as to whether this company is legally incorporated. It has been claimed that while nominally a Michigan corporation it is actually under the sole ownership of a foreign company which is beyond the jurisdiction of the courts of the state. The company claims that it is not organized under the general law, but under a special perpetual charter granted to the old Detroit & Pontiac Co. The suit is not intended in any way to harass or embarrass the company, but merely to determine the legal questions involved.

Detroit, Mackinac & Marquette.—This company gives notice that on June 9 its Marquette & Western line was opened for freight traffic between Marquette, Mich., and Ishpeming, connecting with nearly every iron mine in the neighborhood of Ishpeming and Negaunee. The new road is operated practically as one line with the Detroit, Mackinac & Marquette, and has the same officers as that road.

Evansville & Indianapolis.—This company has filed articles of incorporation in Indiana with a capital stock of $500,000. It is organized by the parties who purchased the Indianapolis & Evansville road at the recent foreclosure sale for the purpose of operating that road, and possibly building some extension. The road is completed from Evansville, Ind., northward to Washington, 55 miles.

Flint & Pere Marquette.—The following statement for the four months ending April 30 is published:

	1884.	1883.	Inc. or Dec.	P. c.
Earnings	$812,799	$826,016	D. $13,217	1.6
Expenses	536,146	551,774	D. 15,628	2 8
Net earnings	$276,653	$274,242	I. $2,411	0.9
Interest charges	111,928	107,020	I. 4,908	4.6
Surplus	$164,725	$167,222	D. $2,497	1.4

The mileage was nearly the same in both years. The working expenses were 66.0 per cent. of gross earnings this year and 66.8 per cent. last year.

Georgia Midland & Gulf.—Surveys for this projected road have been begun at Hamilton, Ga. The line to be run will pass through Ellerslie toward Atlanta.

Grand Rapids & Indiana.—The plan proposed for the settlement of the debts of this company, which has been approved by the bondholders of the Continental Improvement Co., the chief stockholder, provides for the issue of second mortgage 6 per cent. bonds to run 15 years to the amount of $3,000,000, of which $2,700,000 will be used in settlement of the debts due the Pennsylvania Railroad Co., and $300,000 in paying off the floating debt incurred in building the Mackinac extension. Besides this mortgage a consolidated mortgage for $13,000,000 will be made, of which $5,500,000 will be used to pay off the first-mortgage bonds at maturity, $2,500,000 to pay off the income bonds, $3,000,000 to pay the second-mortgage bonds just referred to, $500,000 in settlement of the balance due the Pennsylvania Co., and the remainder, $1,500,000, will be reserved in the treasury for improvements and extensions of the road as required. It is stated that this arrangement will be acceptable to the Pennsylvania Railroad Co. and the Pennsylvania Company, the principal creditors. A committee has been appointed to carry out the agreement between the Grand Rapids & Indiana, the Pennsylvania Railroad Co., the Pennsylvania Co., and the Continental Improvement Co., and complete the adjustment,

Hartford & Harlem.—In consideration of the legal delays to which this company has been subjected, the Connecticut Railroad Commissioners have granted this company an extension of eleven months (to Nov. 30, 1885), in the time in which work must be begun on the road and 10 per cent. of the stock expended upon it. The company asked for an extension of two years.

Henderson Bridge Co.—Sealed proposals will be received at the office of this company in Louisville, Ky., until noon on July 3, for the grading, masonry and trestle work of about nine miles of railroad between Evansville, Ind., and the north end of the bridge at Henderson, Ky. Bids should be addressed to F. W. Vaughan, Chief Engineer. Plans and specifications can be seen at his office in Louisville, or at the office of the Resident Engineer in Henderson, Ky. This is the bridge and railroad which are to connect the two sections of the Louisville & Nashville's St. Louis Division which are now connected by a river transfer.

Lake Shore & Michigan Southern.—The suit brought to enjoin the continuance of the lease of the Jamestown & Franklin road to this company has been brought by W. J. Blakely and other stockholders. The complaint alleges that the Lake Shore Co. owns a majority of the stock of the leased road and has been in the habit of arbitrarily managing the same to the detriment of the other stockholders. It is also alleged that the lessee has not accounted for the rental received from the Buffalo, New York & Philadelphia Co. for the use of the Jamestown & Franklin track between Oil City and Stoneboro. The lease under which the company operated the road expired March 31, and the complainants in the suit charge that the new lease proposed would entirely destroy the value of the stock. The terms of the new lease it is stated are that the Lake Shore Co. is to operate the road for 30 years, retaining 70 per cent of the gross receipts and paying out the remaining 30 per cent.; 1, in payment of interest on the bonds of the Jamestown & Franklin Co.; 2, in payment of interest on the advances made by the Lake Shore Co.; next, in payment of the debt due the Lake Shore, any residue to be paid over to the Jameston & Franklin Co. The practical result of this agreement, it is charged, will be to entirely destroy the interest of the minority stockholders. The Lake Shore owns a majority of the stock. At the last annual meeting a committee was appointed, presumably in the interest of the minority stockholders, to ascertain if more favorable terms could not be secured, and it was finally agreed not to press the suit and that this committee should make its report.

The following statement is made for the six months ending June 30, June partly estimated:

	1884.	1883.	Inc. or Dec.	P.c.
Earnings	$7,330,900	$9,219,171	D. $1,888,271	20 5
Expenses	4,515,400	5,722,966	D. 1,207,566	21.1
Net earnings	$2,815,500	$3,496,205	D. $680,705	19.5
Interest, rentals, etc.	1,800,000	1,749,403	I. 50,597	2.9
Surplus	$1,015,500	$1,746,802	D. $731,302	41.8
Dividends paid	1,731,328	1,978,660	D. 247,332	12.5
Deficit	$715,828	$231,858	I. $483,970	....

The working expenses were 61.59 per cent. of gross earnings this year and 62.08 per cent. last year. The surplus this year is equivalent to 2.03 per cent. on the stock, and the dividends paid are 3½ per cent.; last year the surplus was 3.53 and the dividends 4 per cent.

The statement is accompanied by the following, showing the earnings by half-years in 1872 and 1883:

	Gross.	To Stock.
First half, 1882	$7,952,000	$1,076,000
Second half, 1882	10,273,000	3,064,000
Total	$18,225,000	$4,140,000
First half, 1883	9,219,000	1,747,000
Second half, 1883	9,294,000	2,266,000
Total	$18,513,000	$4,013,000

The Treasurer's statement says: "It will be seen from the foregoing statement that the earnings applicable to stock during the first half of the years 1882, 1883 and 1884, do not amount to the two quarterly dividends usually declared in that period; but the deficiency in 1882 and 1883 was made good in the second half. We have every reason to believe that the same will occur in 1884.

"Extreme competition for traffic began in the second half of 1883, with the usual effect of very low prices. This competition was intensified by the holding back from shipment, under circumstances of peculiar manipulation, of very large quantities of property, and it extended into and through the present half-year with unabated effect.

"Expenses have been reduced in the full percentage of earnings, while the maintenance of the line and equipment have been fully kept up, and the whole property now stands in better general condition than at any other time.

"Upon careful consideration of all the circumstances, however, it has been deemed expedient in the interest of the stockholders to reduce the dividends to a basis of 6 per cent. per annum."

Louisville & Nashville.—A meeting of the board was held in New York, June 24, at which the subject of a plan for the financial relief of the company was discussed, but no definite action was taken, as it was considered best to secure the full approval and co-operation of the foreign stockholders. Mr. Whitehouse, who has just returned from England, said that the London and Amsterdam stockholders seemed to have confidence in the future of the road, and thought that they would be willing to come to the relief of the company. Another meeting is to be held shortly.

Mexican Central.—The following circular has been issued by this company to holders of the first-mortgage bonds:

"The President and several directors have recently inspected the main line from the United States to the City of Mexico, and report that it is well built and in excellent condition; that the volume of business is all that could be reasonably expected at the outset, and that the prospects for the future are encouraging.

"The cost of construction and equipment has largely exceeded the estimates, and in the present general financial condition the company finds it impracticable to dispose of its surplus securities to meet this excess, and pay the coupons due July 1.

"The directors are large holders of the first-mortgage bonds, and, after a careful consideration of the situation, they have voted to recommend to you to fund three coupons, Nos 6, 7 and 8, in accordance with the following offer hereby made by the company for that purpose, and which they themselves will accept, namely:

"The company will issue its coupon notes, dated July 1, 1884, payable in five years or sooner, at the company's option, in denominations of $1,000, $500 and $100, with suitable scrip for fractions, and will give these in exchange (par for par) for first-mortgage coupons, Nos. 6, 7 and 8, all of which are to be severed from the bonds and delivered in equal amounts of each number.

"The notes will bear interest at 10 per cent. per annum, payable semi-annually on presentation of the respective coupons attached to said notes.

"The first-mortgage coupons surrendered as above are not to be cancelled or their lien on the property impaired, but are to be deposited with the Boston Safe Deposit & Trust Co., trustee, to be enforced by the trustee in case of default in the payment of the principal or interest of the notes, or in case of the foreclosure of the first mortgage.

"The notes will also be entitled to the benefit of an indenture of even date, executed by the company and said trustee, setting aside as further security an amount of the subsidy received from the Mexican government equal to the sum of the face of the notes and the coupons attached to them.

"The directors believe that this will enable the company to pay all its floating indebtedness, to increase the earning capacity of the property, to pay its subsequent coupons in cash and within the five years to take up the notes issued in accordance with the above plan.

"The notes and scrip will be ready for delivery at the company's office, in the city of Boston, July 1, 1884."

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of June 14:

The new revenue law is particularly oppressive to the railways, making the tax on the passenger traffic forty times what it has been. The tax was formerly one cent on all tickets of the value of $1 to $20; it is now two cents for every dollar. So, for instance, the lowest priced ticket on the Mexican Central sold out of this city—to Tlalnepantla for 18 cents—will have to pay a tax of one-ninth its value, while on first class tickets to Paso del Norte a tax of $1.20 will have to be paid. It is estimated by the Mexican National Railway that their taxes will amount to something like 5 per cent. of the passenger receipts. Such unequal taxation, bearing heavily on one interest, is manifestly unjust.

Up to the middle of the week there was no through travel, or traffic of any kind over the Mexican Central to or from the United States, except westward toward San Francisco by way of the Southern Pacific, all communication from El Paso northward and eastward having been cut off by the washing away of the track of the Atchison, Topeka & Santa Fe, the Texas Pacific and the Southern Pacific in New Mexico and Texas. Consequently the mail service was badly disarranged, nothing having been received for a week. By the beginning of the week the Santa Fe washouts were repaired so that traffic was resumed by that route. Owing to the washing away of part of the railroad bridge across the Rio Grande no freight could be shipped across the river. The bridge will be repaired as soon as the river falls enough to allow the driving of piles. The present structure being a temporary affair, it will be replaced by a fine iron bridge as soon as practicable. The accident to the bridge has prevented the receiving of coal by the Mexican Central for its locomotives, and consequently there is a short supply, but it is believed that the bridge will be repaired before the store runs out.

Michigan Central.—This company makes the following statement for the six months ending June 30, the June earnings estimated, the comparison made being with the similar statement published a year ago:

	1884.	1883.	Inc. or Dec.	P. c.
Earnings	$5,603,500	$6,740,000	D. $1,136,500	16.8
Expenses	4,216,500	4,591,000	D. 374,500	8 2
Net earnings	$1,387,000	$2,149,000	D. $762,000	35.4
Interest and rentals	1,280,000	1,210,000	I. 70,000	5.8
Surplus	$107.000	$939,000	D. $832,000	88.6

Under the agreement one-third of this surplus (35,667) is paid to the Canada Southern, leaving a balance of $71,333 for the Michigan Central. The Treasurer's statement says:

"It is well known to the stockholders of the company that the railroad traffic of the entire country has largely fallen off during the past six months.

"Many causes have contributed to produce this general effect, and there were besides some which affected this company alone, among which was short production in 1883 in some areas of country entirely contributory to this company's line.

"Strenuous efforts were made to reduce expenses to the lowest point compatible with full maintenance of the property and efficiency of operation; but with much success attending these efforts, and with the economical advantages growing out of the Canada Southern arrangement, it was not found possible to bring expenses down to the same positive extent as earnings fell off. The result thus produced does not justify the declaration of a dividend."

Missouri, Kansas & Texas.—The treasurer of that company has written a letter to Mr. A. G. Dulman, representing the Amsterdam interest of the road, in reference to certain rumors affecting the credit of the company. He states that the available cash surplus April 1 last, was $1,164,495. The interest falling due from April 1 to Aug. 1, amounts to $1,153,305, leaving a surplus of $12,190, without taking into account the net earnings for April, June, May and July. Should the net earnings for this period equal those for the same months in 1883, the company will have an additional amount of $629,000, making the surplus Aug. 1, after paying all interest up to that date, over $641,000. The company, it is said, has no floating debt.

Missouri Pacific.—This company makes the following statement for May and the five months ending May 31, the report covering the Missouri Pacific and the Iron Mountain lines, 1,895 miles of road:

	May.	Five months.
Earnings	$1,254,022	$6,427,968
Expenses	754,302	3,667,975
Net earnings	$499,720	$2,759,993
Per cent. of expenses	60.2	57.1

The increase in net earnings for the five months was $268,762, or 10 8 per cent. Of this increase the Missouri Pacific contributed $227,127, and the Iron Mountain $41,635. The earnings for the five months were $3,392 gross and $1,456 net per mile.

Montreal, Portland & Boston.—The Boston *Advertiser* says: "When the Canadian Pacific had the stock of the Montreal, Portland & Boston sold by the sheriff recently, they were greatly astonished to see a man bid it off and pay for it whom they did not suspect of having the means. He was acting for the creditors of the Vermont National Bank at St. Albans, which holds a majority of the bonds of the road. The result is that if the Canadian Pacific wants the road it will have to buy it of the receivers of the bank, and there are rumors that such a transaction is likely to soon occur."

Nashville, Chattanooga & St. Louis.—This company makes the following statement for May and the eleven months of its fiscal year from July 1 to May 31:

	May.		Eleven months.	
	1884.	1883.	1883-84.	1882-83.
Earnings	$190,751	$171,079	$2,210,130	$2,112,862
Expenses	105,432	95,121	1,221,179	1,187,962
Net earnings	$85,319	$75,958	$988,951	$924,900
Interest and taxes			607,815	596,811
Surplus			$381,136	$328,089

This shows for the eleven months an increase of $97,268,

or 4.6 per cent., in gross earnings; an increase of $64,051, or 6.9 per cent., in net earnings, and an increase of $53,047, or 16.2 per cent., in the surplus over interest charges.

New York, Lake Erie & Western.—A meeting of stockholders of this company was held in London, June 24, at which much complaint was expressed at the fall in the value of the securities of the company, and some inquiry into the management was demanded. A committee was appointed to protect the interest of the English stockholders.

New York & New England.—At a special meeting of the stockholders held in Boston, June 24, it was voted to accept the acts recently passed by the legislatures of Connecticut, Massachusetts and Rhode Island, authorizing the company to issue preferred stock and to use the proceeds of its second mortgage bonds in settlement of the floating debt. The subject of the proposed issue of preferred stock was then taken up and several stockholders expressed their opposition to the issue of the new stock at present, and also deprecated as unwise any plan that would take the road out of the Receiver's hands at the present time. The opinion was expressed that the road had better for sometime remain under its present management. It was decided to appoint a committee to consider all the matters before the meeting, except the formal adoption of the legislative act. This committee consists of Messrs. Jonas H. French, A. J. Leith, T. L. Higginson, R. C. Martin and C. M. Rice, and is to report to an adjourned meeting to be held Oct. 7, in Boston.

New York, West Shore & Buffalo.—In Trenton, N. J., June 21, the United States Circuit Court granted an order authorizing the Receivers to issue and sell from time to time, at a price not less than par, receivers' certificates not to exceed in the aggregate $500,000. The certificates are to be made in a form prescribed by the Court and the proceeds are to be used at the discretion of the Receivers to pay necessary and current expenses, traffic balances now due to connecting roads, amounts due for right of way and station grounds, and amounts due or to become due upon the rolling stock of the company where such payments are necessary to retain possession of the equipment, and also all money due for labor since March 1, and money due for supplies purchased. The Receivers are not to pay out for right of way or real estate any sum exceeding in the aggregate $200,000, nor any sum for rolling stock exceeding $400,000, unless specially authorized by the Court. The Receivers are authorized to execute all necessary leases and warrants for the purchase of rolling stock. It is finally ordered that the certificates issued shall be a lien in charge upon all property covered by the mortgage and prior to the lien of the mortgage. The Court reserves the right of allowing an issue of any certificates for a larger sum than $300,000 The petition filed by the Receivers shows that the amount due for labor from March 1 to June 4 is $450,355; for supplies, $193,322; for terminal expenses, $176,335; for traffic balances, $173,956; for outstanding notes, $245,377; and for right of way and real estate about $300,000. The Receivers also represent that $10,014,480 will be needed prior to June 1 next to make payments on rolling stock purchased and that they have no money on hand and no means of raising any except by action of the Court.

The New York Supreme Court has decided that the appointment of Judge Ashbel Green as Receiver of the North River Construction Company is legal and was properly made, and that the Receiver is duly in possession of the property and assets of the company, and has dismissed the suit brought to set aside the appointment.

New York, Woodhaven & Rockaway.—The controlling interest in this road has been sold to Mr. Austin Corbin, and the road will hereafter be operated as a part of the Long Island Railroad. It has always been worked in connection with that line, its trains running over several miles of the Long Island road to reach the city terminus. The stock bought by Mr. Corbin was owned by Fisk & Hatch, of New York.

Northern (New Hampshire).—In Concord, N. H., June 25, the minority stockholders, who opposed the lease, filed a bill in equity, praying for a perpetual injunction against the operation of the lease of the road to the Boston & Lowell Railroad Co., and pending litigation that a receiver or a trustee be appointed for the Northern Railroad, or that its directors be compelled to resume its management and control, and that the Boston & Lowell Railroad Co. be compelled to refund whatever earnings of said road have come to its hands.

Northern Pacific.—This company announces that after June 20 a regular daily passenger train will be run over its National Park Branch between Livingstone, Mont., and Cinnabar. The company will keep at Cinnabar two sleeping cars to be used as a hotel in case that accommodations are not provided.

Ogdensburg & Lake Champlain.—This road, which some years ago was taken from the control of the Central Vermont Co., has passed back into the possession or control of that company again. At the annual meeting last week nearly all of the old board, chiefly Ogdensburg & Boston people, were dropped and a new board chosen, which has a two-thirds majority of the Central Vermont officers and directors. It now appears that the Central Vermont people have been buying up the stock of the company in Boston for some time past, but have done it so quietly that the change in the directors has been a surprise to all but a very few. The late management, it will be remembered, had close connection with the St. Johnsbury & Lake Champlain and to that end had built and leased a 12-mile road from Rouses Point to Swanton, including a bridge over Lake Champlain. It is of course the chief object of the Central Vermont people in again securing control of the road to carry as much of its traffic as possible over the Vermont linessand probably the somewhat expensive connection with the St. Johnsbury & Lake Champlain will have comparatively little use hereafter, certainly not as much as its builders expected.

Ohio River.—This road was fully opened for traffic June 21, when regular passenger trains began to run. The distance from Parkersburg, W. Va., to Wheeling by the new line, which follows pretty closely the eastern bank of the Ohio River, is 94 miles. The stations on the road are Parkersburg, Vienna, Briscoe, Henderson, Williamstown, Bull Creek, Willow Island, Eureka, Vaucluse, St. Mary's, Grape Island, Raven Rock, Long Reach, Friendly, Sisterville, Paden's Valley, Sardis, New Martinsville, Baresville, Proctor, Clarington, Fish Creek, Powhatan, Moundsville, Benwood and Wheeling.

Pennsylvania.—The Pennsylvania Schuylkill Valley road was opened for travel June 23, to Norristown, 18 miles from the Broad street station in Philadelphia. Frequent trains are run, and their number will be increased as further sections of the road are opened. The new line is everywhere nearly parallel and close to the Philadelphia & Reading. It has a double track.

The company's statement shows for all lines east of Pittsburg and Erie, for May, 1884, as compared with the same month in 1883:

A decrease in gross earnings of	$35,833
A decrease in expenses of	66,653
An increase in net earnings of	$30,820

The five months of 1884, as compared with the same period in 1883, show for the same lines:

A decrease in gross earnings of	$768,633
A decrease in expenses of	458,165
A decrease in net earnings of	$310,468

Carrying out these comparisons, we have the following statement:

May;	1884.	1883.	Inc. or Dec.	P. c.
Earnings	$4,267,173	$4,303,006	D. $35,833	0.8
Expenses	2,627,679	2,694,322	D. 66,653	2.5
Net earnings	$1,639,494	$1,608,674	I. $30,820	1.9
Per cent. of exps.	61.6	62.6	D. 1.0	...
Five months:				
Earnings	$19,427,080	$20,195,713	D. $768,633	3,8
Expenses	12,398,060	12,856,225	D. 458,165	3 6
Net earnings	$7,029,020	$7,339,488	D. $310,468	4.2
Per cent. of exps.	63.8	63.7	I. 0.1	...

All lines west of Pittsburgh and Erie for the five months of 1884 show a deficiency in meeting all liabilities of $363,562, being a decrease as compared with the same period of 1883 of $755,526.

Philadelphia & Reading.—April wages on the main line have been finally paid in cash, payment having been begun June 19. The Receivers have secured the necessary funds by the issue of certificates as authorized by the Court.

The Receivers give notice that, in compliance with the order of the Court, they will be prepared to issue after June 30 next certificates bearing 4 per cent. interest for all claims for material and supplies furnished to the company since April 1. All parties having such claims are requested to present them for settlement as soon as possible.

Pittsburgh, McKeesport & Youghiogheny.—The track of this road is now completed to Connellsville, Pa., two miles beyond the late terminus at New Haven and 60 miles from Pittsburgh. The road will be formally opened to the new terminus shortly.

Queen City & Spring Bank.—Work is in progress on this road, which is of 3 ft. gauge, and is to be built at present from Queen City, Tex., on the Texas & Pacific road southward 8 miles. It will be extended further as business requires.

Richmond & Chesapeake.—This company has been organized under a charter granted by the Virginia Legislature last winter to build a railroad from Richmond to the mouth of the Potomac River, crossing the Pamunky at Hanover Town, the Mattaponi at Ayletts, and the Rappahannock at Tappahannock. It is proposed to connect the road with the Maryland Central at Point Lookout by a steam ferry.

Rochester & Ontario Belt.—The New York Supreme Court in Rochester has appointed George E. Merchant Receiver of this road in a suit brought by the Mercantile Trust Co. of New York. The road was intended to connect the roads entering Rochester with Lake Ontario at Charlotte, but only a short section of it has been built, running from the north side of the city to the lake. The bonds and stock are all or nearly all held by Mr. W. H. Brown, President of the Rochester & Pittsburgh Co., and it is probably his intention to foreclose the mortgage in order to secure the complete control of the property.

Rochester & Pittsburgh.—President Walston H Brown is reported as making the following statement:

"Last December $2,000,000 of second mortgage bonds, out of a total of $2,800,000 issued, were offered to the stockholders, but none of them were taken. The directors (Walston H. Brown & Brothers) took $1,100,000 of them, and the money was used to purchase new rolling stock, according to the provisions of our circular agreed to by the stockholders. The balance, not taken, was to be applied to the liquidation of the floating debt of the company. Deducting the $1,100,000 bonds taken by us and applied to the purchase of rolling stock, there was left in the treasury $1,700,000, supposed to be quite sufficient to enable the company to carry its floating debt; but it has been found impossible to borrow money on these bonds owing to the bad times that have come upon everybody. The floating debt is now between $1,100,000 and $1,200,000. If there be any way of carrying this debt we shall do it, but I don't believe the times are going to improve at all. Walston H. Brown & Brothers have $2,000,000 of these second-mortgage bonds, and we have not sold a share of our stock. The road is doing an enormous business, but the competition has brought rates down very low. Under these circumstances it has been proposed by some of the largest stockholders to assess the stock 15 per cent., which would produce $3,000,000. This money could be used in payment of the floating debt, the purchase of $2,000,000 of the second-mortgage bonds at 75 per cent. of their par value, and the payment of car trust bonds, leaving the road with only $20,000 a mile of bonds ahead of the stock."

Rome, Watertown & Ogdensburg.—This company makes the following statement for May and the eight months of the fiscal year from Oct. 1 to May 31:

	May.		Eight months.	
	1884.	1883.	1883-84.	1882-83.
Earnings	$137,356	$125,845	$1,065,237	$1,053,423
Expenses	96,123	125,194	740,688	913,8:9
Net earnings	$41,233	$651	324,549	$139,594
Per cent. of exps	70.0	99.5	69.5	86.7

This shows for the eight months an increase in gross earnings of $11,814, or 1.1 per cent.; a decrease in expenses of $173,141, or 19.0 per cent., and a consequent gain of $184,955, or 132.1 per cent., in net earnings.

Securities on the New York Stock Exchange.—The Governing Committee of the New York Stock Exchange has placed the following securities on the lists:

Chicago, Milwaukee & St. Paul, $800,000 additional Chicago & Pacific Western Division bonds, making $18,540,000 in all listed.

Cleveland, Columbus, Cincinnati & Indianapolis, $1,000,000 additional general consolidated bonds, making $2,500,000 listed.

Minneapolis Union, $650,000 additional first-mortgage bonds, making $2,150,000 listed.

Milwaukee & Northern, $1,958,000 first-mortgage 6 per cent. bonds.

Mobile & Ohio, $1,000,000 new first-mortgage extension bonds.

Oregon & California, $600,000 additional first-mortgage bonds, making $9,000,000 listed.

South Pennsylvania.—Suit has been begun in the Wayne County court at Waynesboro, Pa., to enjoin this company from building its road on the present location along the Cheat River, at Point Marion, in Fayette County. The line there, which is through a narrow pass where there is not room enough for two railroads, is claimed by the Baltimore & Ohio under a previous location made for its Ohio & Baltimore Short Line. The Baltimore & Ohio now hold possession of the disputed line.

Texas & Pacific.—The directors of this company have ordered the issue of scrip, in accordance with the terms of the mortgage, for twelve months' interest to July 1, 1884, on the income and land grant bonds of the company. The scrip will be issued to the holders of bonds as registered on the books on June 30 and will be delivered on and after July 20.

This action was taken at a recent meeting of the board. It is said that at the same meeting the question of paying the July coupons on the New Orleans Pacific bonds was brought up, but no action was taken.

Toledo, Cincinnati & St. Louis.—The Boston *Advertiser* of June 25 says: "Next Saturday, at Cincinnati, five divisions of the Toledo, Cincinnati & St. Louis Railroad, which embrace all of the system, except the St. Louis Division, will be sold at auction by special master commissioners appointed by the United States Circuit Court. Various committees of the bondholders met in Boston yesterday to choose committees to attend and bid off the roads if they can do so at a reasonable price. Messrs. Irving A. Evans and George M. Smalley were appointed to bid off the Cincinnati Division, A. A. Pope and Mr. Evans to bid off the Dayton Division, and Charles R. Batt and N. B. Mansfield to bid off the Southeastern Division. It has been difficult to raise the money for the purchase, although the requirement for the combined roads was only $50,000. Boston banks do not look with favor upon T., C. & St. L. securities as collateral. The money was obtained, however, and unless there is too much competition, the Boston people will buy the roads and probably reorganize them. There has been no sale of the St. Louis Division ordered yet, and that fact alone is deemed sufficient to account for the tardiness of many of the bondholders in assenting to either the Quigley plan or the Corbin plan. Apparently the former plan, being the first one offered and being in charge of the trustees of the mortgage, has received the assent of the larger number of bonds; but the Corbin committee have secured upward of $600,000 in amount, and have declared their purpose to buy the road when sold. At the same time, Mr. Corbin is moving for a St. Louis outlet for his Indianapolis, Bloomington & Western, and he says that if his proposition to lease this road is not assented to he will build a parallel line. This is disclaimed as a threat, but announced as a fact worthy of timely consideration."

A Cincinnati paper outlines a project for making the Cincinnati Northern part of a line to Columbus. The road owns the right of way to Waynesville; the grading from that point from Dodds is completed, and the bridges are in place. At Waynesville another road commences and runs to Columbus, our state capital. This latter road is known as the Columbus & Cincinnati, and consists of the right of way and a roadbed that is graded for 60 miles, and is ready for the ties and iron. The farmers along the line of this Columbus & Cincinnati road subscribed a long time ago $300,000 in cash and real estate to aid the enterprise, but it was never completed, and the only work done on it was the grading. It is said, however, that the people along the line would go go down into their pockets again if they were sure the road would be completed.

The plan now is to buy in the Northern, consolidate the two interests, and thus have the short route to Columbus. The route formed by the consolidation of these two roads would be about ten miles shorter than the Pan-handle and five miles shorter than the Columbus & Cincinnati Midland road, now under course of construction, which is to tap the Cincinnati, Washington & Baltimore near New Vienna, and which is a Baltimore & Ohio enterprise.

A reorganization is of course to take place after the Northern is bought in, and it is said a construction company is ready to build and equip the road for a certain share of the bonds and stock. The projectors of this plan propose to make the road standard gauge, and they also propose to sell the road to the Indiana, Bloomington & Western Co. when completed.

Troy & Boston.—A report comes from Troy that negotiations are pending for a sale of this road to the Boston, Hoosac Tunnel & Western Co. The two roads are parallel and competing lines. A large interest in the Troy & Boston is owned by Mr. Vanderbilt.

Union Pacific.—The contract for grading the extension of the Wood River Branch of the Oregon Short Line from Hailey, Idaho, to Ketchum, a distance of 12 miles, was let on June 10 to the Utah Contracting Co. The work is to be finished by Aug. 1.

Mr. Adams has effected a settlement with the Senate Judiciary Committee which is good now, and may lead to an ultimate adjustment of all the questions at issue, by permitting this company, as well as the Central Pacific, to extend their whole indebtedness in a 60 year 3 per cent. bond, on which annual interest should be regularly paid. If this should be done, it is claimed, the government would have a good security, and, considering the incidental benefits to the country by the construction of the Pacific roads, the government might fairly point to its subsidies granted them as the most profitable investment it had ever made. The present adjustment is shown in the statements following. The Chairman of the Senate Judiciary Committee has sent to the Secretary of the Interior a letter informing him of the adoption of the following resolution in regard to the Union Pacific questions which the Committee has had under consideration for some time:

"*Resolved*, That this Committee will postpone until the first Monday in December, 1884, the further consideration of the matters arising under the act of May 7, 1878, relating to the Union Pacific Railway Co., if the said company shall immediately carry out the offer of Mr. Adams, as stated in his communication dated June 17, 1884, addressed to the Hon. George F. Hoar, and on the express understanding that this action of the company and of the United States in receiving the money and security in said communications mentioned, shall have no effect or any penalty or forfeiture or other right of the United States incurred or arising, or to occur or arise against the said company or any of its officers; but that all rights, penalties and forfeitures shall stand as if these acts had not been done."

Following is the communication of Mr. Adams, as delivered to Mr. Hoar:

"Referring to what passed at your meeting with certain directors of the Union Pacific Railway Co., in Boston, on the 10th inst., I would state that the following was there proposed as the basis of temporary settlement with the government, pending action of the courts on claims now in dispute:

"First—No further dividends shall be paid on the stock of the company during the present year.

"Second—Until the questions now pending in court are decided and a settlement between the government and the company effected, the government shall retain in the treasury all earnings now due, or which may hereafter become due, not only on the subsidized lines of the company, but also on the non-subsidized portion of its lines specified in

President Dillon's letter of June 5, addressed to the Secretary of the Interior.

"Third—Saving all its legal rights on points in litigation, the company will forthwith pay into the Treasury on account of the sinking fund the sum of $718,814.60, being the amount demanded by the Secretary of the Treasury as payment under the Thurman act for the year ending Dec. 31, 1883; said sum to be treated as a payment on account should more hereafter prove to be due to the government, and as a payment in advance of amounts in future to become due should less prove now to be due.

"Fourth—The sum of $68,359.83 deposited in the Treasury July 26, 1881, shall be carried to the credit of the sinking fund, as set forth in President Dillon's letter of June 5, 1884, already referred to.

"The above proposition, it is submitted, affords the Government ample security for payments which shall become due when the matters at issue in the construction of the Thurman act shall have been decided by the courts. According to the contention of the company (supplemental statement June 6, page 5), the balance now due which this proposal would leave unpaid (supposing the demand by the Secretary of the Interior was otherwise correctly computed), would be only $598,146. As security for the payment of this sum the government holds in its hands the adjusted [unadjudicated] though in large part not disputed claims of the company against it to the amount of $4,360,496, and also the amounts assumed to be due for services rendered on the subsidized portion of its lines, which will before the close of the year amount to some $300,000."

Wabash, St. Louis & Pacific.—In the United States Circuit Court in St. Louis, June 24, the Receivers filed several petitions. One of them asks permission to defend a large number of suits now pending against the company in the several states through which it passes. The claims against the company involved in these suits amount to over $2,000,000, but the Receivers think that, if properly defended or compromised, it will not take more than $150,000 to satisfy them all. Another petition asks for instructions from the Court in relation to a number of judgments which have been obtained against the company, amounting to about $248,000 in all, and the third petition asks for the power to adjust legal claims for damages, and also to employ counsel. Finally the Receivers ask for power to purchase new equipment. The Court heard all the petitions and the Receivers' arguments, but declined to make any order except one ordering the Receivers to defend the pending suits and to adjust all claims not exceeding $3,000. The remaining applications are taken under advisement.

This road has begun to run suburban or belt trains around St. Louis. The trains run from the Union Depot by way of Forest Park and Ferguson, to the old terminus of the road at the Vine Street Station, near the St. Louis bridge, making almost a complete circuit of the city and touching a number of points of resort such as Forest Park, O'Fallon Park and a number of cemeteries. Stations are placed at convenient points and it is proposed to run frequent trains. The trains start from each end of the route, running through from Vine street to the Union Depot and vice versa. The company expects to build up a considerable city traffic in this way.

Western & Atlantic.—This company has ordered a reduction of 10 per cent. on all salaries exceeding $50 a month. It will take effect July 1 and continue during the months of July and August. The reduction will not apply to trainmen, who are paid by the distance run, and will therefore affect principally the workmen in the shops. The arrangement is regarded as more satisfactory than the discharge of a number of the employés.

Wisconsin, Iowa & Nebraska.—This road is now completed to Cedar Falls, Ia., 7.1 miles eastward from the late terminus at Wilson, and 106.8 miles from the Western terminus at Des Moines. Regular trains have begun to run to the new terminus, the extension having been opened June 22.

ANNUAL REPORTS.

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Terre Haute & Indianapolis.

This company owns a line from Indianapolis, Ind., to the Illinois state line near Terre Haute, 79.40 miles, with 48.378 miles of ordinary sidings and 35.657 miles of coal mine sidings and spurs. It also operates the St. Louis, Vandalia & Terre Haute road, from the Illinois state line to East St. Louis, 158.3 miles, and the Terre Haute & Logansport, from Terre Haute to South Bend, but the accounts of those lines are stated separately. The report is for the year ending Oct. 31.

The equipment consists of 48 locomotives; 22 passenger, 5 postal, 11 baggage and 6 express cars; 348 box, 79 stock, 12 wood, 97 flat, 1,257 coal and 23 caboose cars; 1 directors' car, 1 pay car, 2 wrecking and crane and 41 work-train cars.

The general account is as follows:

Stock		$1 988,150.00
Funded debt		1,600 000.00
Bills payable		586,900 00
Accounts and balances		807,122.16
Income account, surplus		1,413,881 91
Total		$6,486,054.07
Road and equipment	$3,460,987.82	
Securities owned	970,620.00	
Supplies, etc	248,391.57	
Current accounts and balances	1,345,661.73	
Other current assets	200,565.46	
Cash	250,827.49	
		6,486,054.07

The funded debt consists of first-mortgage 7 per cent. bonds, of which $1,244.000 are coupon bonds, and $356,000 registered bonds. There was no change in stock or bonds during the year. The securities owned are chiefly of the leased lines. The cash and current assets are largely in excess of the floating liabilities.

The traffic of the line owned for the year was as follows:

Train-miles:	1882-83.	1881-82.	Inc. or Dec.	P.c.
Passenger	224,909	201.278	D. 36,369	13.9
Freight	468,257	474,401	I. 23,856	5.0
Service and switching	432,027	391,343	I. 40,684	10.4
Total	1,155,193	1,127,022	I. 28,171	2.5
Pass. car miles	1,445,938			
Freight car miles	11,152,660			
Passengers carried	340,144	330,943	I. 9,201	2 8
Passenger-miles	12,490,434	12,467,885	I. 22,549	0.2
Tons freight carried	1,541,492	1,616,892	D. 75,400	4.7
Ton-miles	82,644,861	86,938,841	D. 4,293,980	4.9
Av. train-load:				
Passengers, No	56	48	I. 8	16.7
Freight, tons	166	183	D. 17	9.3

Of the freight car movement 72.4 per cent. was of loaded cars. Through business furnished 53.1 per cent. of the passenger-miles and 68.9 per cent. of the ton-miles last year. The coal tonnage last year included 601,525 tons of coal and 98,049 tons of coke, showing a decrease of 9½ per cent. from the previous year.

The average receipt and cost per train-mile and per unit of traffic were as follows, in cents:

Per train-mile:	1882-83.	1881-82.	Inc. or Dec.	P. c.
Receipt	117.8	116.3	I. 1 5	1 3
Cost	81.1	77.1	I 4.0	5.2
Net	36.7	39.2	D. 2.5	6.4
Per pass.-mile:				
Local	2.819	2 845	D. 0.026	0.9
Through	2.326	2.201	I. 0.125	5.7
Average receipt	2.557	2.502	I. 0.055	2.2
Cost	1.873	1.987	D. 0.114	5 7
Net	0.684	0.515	I. 0.169	32.8
Per ton-mile:				
Local	1.819	1.859	D. 0.040	2.2
Through	0.725	0.643	I. 0.082	12.8
Average receipt	1 006	1.006	I. 0 060	6.0
Cost	0.798	0.695	I. 0.103	14.8
Net	0.268	0.311	D. 0.043	13.8

The increase in freight rates was entirely on through business, the local rate showing a decrease.

The earnings of the line owned for the year were as follows:

	1882-83.	1881-82.	Inc. or Dec.	P. c.
Freight	$880,635	$874,730	I. $5,905	0.7
Passengers	319,381	311,972	I. 7,409	2.4
Mail and express	77,312	74,256	I. 3,056	4.1
Rents, etc	20,362	24,475	D. 4,113	16.8
Total	$1,297,690	$1,285,433	I. $12,257	0.9
Expenses	893,587	852,122	I. 41,465	4.9
Net earnings	$404,103	$433,311	D. $29,208	6.7
Gross earn. per mile	16,344	16,189	I. 155	0.9
Net " " "	5,089	5.4:7	D. 368	6.7
Per cent. of exps	68.86	66.29	I. 2.57	....

The increase in earnings was chiefly due to the increased rates received on a smaller traffic. The increase in expenses was in motive power (owing to extraordinary renewals and improvements), in maintenance of way, and in the taxes paid.

The expenses for last year were as follows:

	Amount.	P. c of exps.	P. c. of earn.
Conducting transportation	$325,563	36.42	25.09
Motive power	254,001	28.42	19.57
Maintenance of way	158,125	17.71	12.19
Maintenance of cars	90,062	10.08	6.94
General expenses	65,836	7.37	5.07
Total	$893.587	100.00	68.86

Taxes paid are included in the general expenses. During the year 302 tons of steel rails and 49,659 new ties were used in renewals. There is included in maintenance of way $39,869 for new work, including the raising of grade at Cloverland and the building of 1.818 miles of new sidings and 2.037 miles of coal mine sidings and spurs. A considerable amount was also spent for raising the grade in the Wabash bottom and for new ballast.

The income account was as follows:

Net earnings, as above		$404.103.26
Received from investments		49,674.00
Total		$453,777.26
Interest on bonds	$112.000.00	
Dividends, 8 per cent	159,052.00	
Loss in operating St. L., Van. & T. H.	23,079.85	
" " T. H. & Logansport	141,208.14	
		435,339.99
Surplus for the year		$18.437.27
Balance from previous year		1,395,444.64
Surplus, Oct. 31, 1883		$1,413,881.91

The amount received on investments was equal to 5.12 per cent. upon the stocks and bonds owned by the company.

The President's report says: "Although the tonnage has been decreased, the earnings show an increase, while the increased expenditure is amply compensated for by the betterments to your property, which maintains its high standard of excellence.

"The Terre Haute & Logansport Railroad Co. is extending its line from Logansport to South Bend, Ind., which, on its completion during the current year, will be operated by your company in connection with the Terre Haute & Logansport Division. This line will open a territory heretofore inaccessible to this company, and which, it is believed, will prove a valuable feeder."

The report of the leased St Louis, Vandalia & Terre Haute road has already been published (page 196); its operation showed a net loss, after paying rental, of $115,399, of which one-fifth is paid by this company, as charged in the income account above.

TERRE HAUTE & LOGANSPORT.

This road, as worked last year, extended from Terre Haute, Ind., to Logansport, 116.493 miles, an increase of 0.493 miles over the previous year, made by an extension in Logansport. An extension to Marmont, 33.1 miles, was built last year and partially opened for business near the close of the year. A further extension from Marmont to South Bend is now nearly finished.

The equipment of this division consists of 8 locomotives; 6 passenger and 3 baggage cars; 34 box, 6 stock, 557 coal, 16 flat and 6 caboose cars. During the year 250 new coal cars were bought and 109 leased.

The traffic for the year was as follows:

Train-miles:	1882-83.	1881-82.	Inc. or Dec.	P. c.
Passenger	157,394	150,409	I. 6,985	4.7
Freight	221,380	197,190	I. 24,190	12.3
Other	96,927	41,652	I. 55,275	132.5
Total	475,701	389,251	I. 86,450	22.2
Passengers carried	214,871	198,080	I. 16,791	8.5
Passenger-miles	3,613,037	3,319,334	I. 293,703	8.9
Tons freight carried	260,052	256,993	I. 3,059	1.2
Ton-miles	18,074,603	18,707,166	D. 632,563	3.4
Av. train load:				
Passengers, No	23	22	I. 1	4.5
Freight, tons	82	95	D. 13	13.7
Av. receipt:				
Per pass.-mile	2.781 cts.	2.798 cts.	D. 0.017 ct.	0.6
Net loss	1.108 "	1.454 "	D. 0 346 "	24.0
Per ton-mile	1.123 "	1.164 "	D, 0.041 "	3.5
Net loss	0.183 "	0.101 "	I. 0.082 "	81.2

The expenses exceeded the receipts on both passengers and freight. The rate per ton-mile local was 1.334 cents; through, 0.589 cent, the average of all being 1.123 cents. The earnings per train mile were 82.9 cents, and the expenses 99.4 cents, leaving a loss of 16.5 cents per mile run.

The earnings for the year were as follows:

	1882-83.	1881-82.	Inc. or Dec.	P.c.
Freight	$202,918	$217,756	D. $14,838	6.8
Passengers	100,475	92,891	I. 7,584	8 2
Mail, etc	10.519	10,605	D. 86	0.8
Total	$313,912	$321.252	D. $7,340	2.3
Expenses	376,642	377,868	D. 1,226	0.3
Deficit	$62.730	$56,616	I. $6,114	10.8
Gross earn. per mile	2,695	2,769	D. 74	2.6
Per cent. of exps	119.98	117.62	I. 2.36	....

On this line also there was an increase in rates which very nearly offset the decrease in tonnage. The expenses were increased by extensive renewals; 2,632 tons of steel rails and 29,762 new ties were used. 4.623 miles of new sidings were built and 42.57 miles of track were ballasted. Extensive renewals were made to bridges, buildings and equipment. Since this road was leased it has been necessary to rebuilt it almost entirely.

The income account was as follows:

Deficit in earnings, as above	$62,730.08
Rental, 25 per cent. of gross earnings	78,478.06
Total loss on lease	$141,208.14

The total loss for the preceding year was $136,929. A better result is looked for, as the old line is now in fair condition and the extension is nearly completed. Additional business is expected and a reduction of maintenance expenses is probable.

New York & Greenwood Lake.

This company owns a line from West End, N. J., to the New York state line at Greenwood Lake, 43 miles, with a branch to Ringwood, 3 miles. It works under lease the Watchung road, from Woodside to West Orange, 4 miles. Its trains run over the New York, Lake Erie & Western track from West End to Jersey City, 2 miles, and use the Erie stations and ferries to New York. The report is for the year ending Dec. 31.

The general account, condensed, is as follows:

Stock		$100,000
Funded debt		2,720,000
Floating debt		225,465
Total		$3,045,465
Road and equipment	$2,850,240	
Other items	30.514	
Income account, debit balance	164,711	
		3,045,465

There was no change in stock or bonds during the year. The stock is nominal in amount; the funded debt is $59,130 per mile owned and the cost of road and equipment $61,942 per mile.

The funded debt consists of $900,000 first-mortgage bonds, $1,800,000 second-mortgage bonds and $20,000 bond and mortgage. The floating debt includes $27,425 unpaid taxes, $12,972 advances by Cooper & Hewitt, $109,085 advances by New York, Lake Erie & Western Co. and $75,983 pay-rolls and accounts.

The earnings for the year were as follows:

	1883.	1882.	Inc or Dec.	P.c.
Earnings	$172.968	$175,100	D. $2.132	1.2
Expenses	166,493	154,688	I. 11,805	7.6
Net earnings	$6,475	$20,412	D. $13,937	68.3
Gross earn. per mile	3,459	3,502	D. 43	1.2
Net earn. per mile	129	408	D. 279	68.3
Per cent. of exps	96.26	88.34	I 7.92	—

The result of the year was as follows:

Net earnings, as above		$6,475
Interest	$11,980	
Loss operating Watchung R. R.	6,269	
		18,249
Loss for the year		$11,774

Interest paid is on the floating debt only, none having been paid on the bonds.

Mr. Abraham S. Hewitt, President of the company, says in his report: "The revenue received from all sources amounted to $172,968, showing a falling off from the receipts of the previous year of $2,132. The cost of maintaining and operating the road, exclusive of taxes and interest, but including the loss in operating the Watchung Branch, amounted to $172,763, being an increase in the expenses of $18,074 The amount of interest on floating debt was $11,980. The practical result, therefore, of the year's business is that the deficit on Dec. 31, 1882, amounting to $152,936, has been increased to $164,711, the latter being the amount of deficit Dec. 31, 1883. This sum has been advanced to the company—three-fourths by the New York, Lake Erie & Western Railroad Co. and one-fourth by Cooper & Hewitt—and is secured by an assignment of the tax liens and of the liens for wages advanced for operating the road. * * * It will be observed that the earnings of the business just about sufficed for the payment of the current expenses, and that the increase in the deficit is practically the interest charge upon the floating debt. But so far as the operation of the road is concerned, the maintenance of way in 1883 exceeded the expenditures of 1882 by $11,654. This additional expenditure is represented by an increased mileage of steel rails, and of other improvements in permanent way. During the present year the steel track will be completed to Little Falls, or rather more than one-half the total length of the road. That the earnings do not increase is due chiefly to the depression in the iron business, and to the smaller receipts from the transportation of ice, which last year was sold at a very low price. * * * The Legislature of New Jersey, at its last session, enacted a new tax law, under the operations of which it is hoped that this company may be relieved from the burden of taxation, which, from the beginning, has weighed it down."